

# THE AUTOMOBILE

WITH ONE GALLON  
of  
GASOLINE

Willys  
Cup

Class "C"  
Cup



Franklin, Double Winner.

THERE have been a number of so-called economy or efficiency tests, but it remained for the New York Automobile Trade Association to hold one that was really worth while and get results that will be a benefit to automobilists for all time. The contest held was scheduled to wind up the carnival week, but as the weather man did not favor, it had to be postponed. As held on Friday of last week, the weather was ideal and doubtless had much to do with the fine results obtained in the contest.

The trouble with former contests of this nature has been a fundamental one in that the winning was made a matter of distance solely. Now any one can figure out that a very light car would travel farther than a very heavy one and on the same fuel. So these contests only proved something that was well known. In the contest of last week, however, this was changed and the winner was decided on a ton-mile basis. That is, the award was based upon the distance traveled by the car multiplied by its aggregate weight in pounds. In this manner real economy

was necessary, for a light car might travel a great distance and not stand a show with a heavy car traveling a much smaller number of miles. In fact, the real factor was the weight and not the mileage, for in the process of multiplication the larger, and consequently the influencing factor was the large weight and not the small distance, as shown by the results.

Weight alone could not win, of course, but the combination of weight with a natural traveling ability, or innate economy, was the winning one. That this fact was appreciated was shown by the statistics which pertained to the winner. This turned out to be a Franklin four-cylinder car of 18 horsepower. The air cooler's score did not run along lines of wonderful distances, its mileage being exceeded by the Cadillac single-cylinder of 10 horse, the Brush entry and one of the two-cylinder Buicks. Where the Syracuse contingent made up was in the weight which they carried, their percentage of live to total load being the largest of all cars by a considerable margin. There were close to thirty

WINNERS AND CLASSES.				
Class.	Car.	Driver.	Mileage.	Pound-Miles.
C.	Franklin	S. G. Averell	35.8	103,104
A.	Cadillac	Lucien Burn	42.6	99,045
F.	Lozier	H. Cobe	17.2	98,433
B.	Buick	H. B. Cook	41.1	86,574
E.	Fiat	Ralph De Palma	25.9	84,434
G.	Thomas	Oscar Hansen	22.7	76,839
D.	Overland	H. Cassidy	16.0	53,500



Starting from the A.C.A



### Brush Contestant Starting.

Thomas Taxi, Winner in Class G.

**De Dion Taxicab at the Start.**

entries made or promised, but just twenty cars showed up and were started. Many of them appeared at the starting line long after the contest was scheduled to begin, and consequently it was necessary to make the technical examination at a time when they were scheduled to be on the road. After the twenty were examined by the zealous and efficient committee of technical experts, each machine was run onto the scales of the A. C. A. on West Fifty-fourth street, where the contest was started.

They were then weighed, both with and without their complement of passengers, after which the final examination was made of the gasoline system previous to furnishing them with the measured and sealed one-gallon can of fuel. It took about an hour after the contest was slated to begin before Starter Fred Wagner was able to send away the first of the machines, which happened to be not only No. 1 entrant and No. 1 starter, but turned out to be No. 1 finisher, too. After that the cars were sent away at regular intervals of six minutes each.

Although the six-cylinder engine is usually considered to be a "fuel eater," two makers showed the courage of their convictions and started "sixes." One of these, the big six Lozier, carrying the second heaviest load of the day, made an excellent showing and won second in the contest as a whole and first in its class.

The cars were divided into classes according to the lately adopted price and power classification. Not only were all classes

represented, but there was in addition a specially made class for taxicabs, regardless of power and price. The latter furnished one of the best contests of the day, having three starters, all of them foreign makes. One of these, the Fiat, driven by the redoubtable racing driver De Palma, after a miserable start in which he stalled his engine, made a very noteworthy score.

The result of the contest was to show people how cheaply an automobile could be driven a comparatively long distance. In this way the obtained figures were a great surprise to many, particularly in the medium-priced class, carrying the usual number of five passengers. This class had the greatest number of entrants and aroused by far the greatest enthusiasm.

Like any other contest, there were some troubles, but as far as serious accidents were concerned the afternoon's sport was not marred by a single mishap. Tire troubles, which often spoil a day's sport or mar an otherwise fine contest, were, strange to relate, noticeable by their absence, only one contestant and one of the official cars suffering a puncture. Beyond that there was no tire trouble.

Picturesque Long Island roads in the Borough of Queens were the real scene of the contest. The route led from the clubhouse of the Automobile Club of America to the Queensboro bridge, and from thence through Woodside, Flushing, Bayside, Manhasset, Jericho, Hicksville and Freeport via the Merrick

TABULAR STORY OF THE ONE GALLON EFFICIENCY TEST, NEW YORK CITY, MAY 7, 1907.

CLASS C—FOR CARS SELLING FROM \$1,251 TO \$2,000											
No.	Car	Cylinders	H.P.	Weight	Mileage	Elapsed Time	Number of Passengers	Order of Start	Official Score, Pound Miles	Ton Miles	
				Light	Loaded						
1	FRANKLIN.....	4	18	1,900	2,880	35.8	2:57	5	1	103,104	51.55
9	CHALMERS.....	4	24	2,275	3,045	25.7	1:26	5	17	78,300	39.11
7	CHALMERS.....	4	24	2,370	3,205	21.0	1:32	5	18	67,305	33.63
8	CADILLAC.....	4	25	2,530	3,115	21.55	....	4	20	67,128	33.36
11	KISSELKAR.....	4	29	2,435	3,290	13.3	....	5	9	43,757	21.88
CLASS A—FOR CARS UP TO \$850											
9	CADILLAC.....	1	10	1,625	2,325	42.6	3:06	4	19	90,045	49.52
22	BRUSH.....	1	7	1,080	1,370	40.6	....	2	3	55,622	27.81
21	BRUSH.....	1	7	1,110	1,420	20.9	....	2	2	29,678	14.84
CLASS F—FOR CARS SELLING FOR \$4,000 AND OVER											
14	LOZIER.....	6	50	4,025	5,230	17.2	2:14	7	15	89,433	44.72
12	MATHESON.....	4	45	4,450	5,600	15.5	1:18	7	11	86,800	43.40
17	RENAULT.....	4	14-20	3,530	4,215	13.3	1:10	5	16	56,059	28.03
CLASS B—FOR CARS SELLING FROM \$851 TO \$1,250											
5	BUICK.....	2	16	1,695	2,105	41.1	....	3	10	86,574	43.29
2	OVERLAND.....	4	25	2,150	2,580	24.95	1:57	3	14	64,434	32.22
6	BUICK.....	4	22	2,230	3,070	18.5	2:07	5	6	56,835	28.44
CLASS E—FOR CARS SELLING FROM \$3,001 TO \$4,000											
25	FIAT.....	4	12	2,530	3,260	25.9	1:34	5	4	84,434	42.22
21	LANCIA.....	4	14	2,560	3,220	23.9	....	4	5	76,958	38.48
CLASS G—FOR TAXICABS											
33	THOMAS.....	4	16-20	2,730	3,385	22.7	1:41	4	7	76,839	38.42
15	DE DION.....	4	12	2,460	3,090	18.0	1:19	5	13	55,620	27.81
16	DE DION.....	4	12	2,400	3,050	17.8	1:26	4	12	54,290	27.15
CLASS D—FOR CARS SELLING FROM \$2,001 TO \$3,000											
3	OVERLAND.....	6	40	2,690	3,345	16.0	0:49	4	8	53,500	26.75
Total cars started: 20. Total gasoline: 20 gallons. Total weight of cars: 48,775; with passengers: 62,800. Average pounds per horsepower of cars: 110. Average weight of empty cars: 2,438.75. Average weight of loaded cars: 5,140. Average time over trip taken by all cars: 1:45:25. Average power per cylinder: 6.07 horsepower. Average power per car: 22.15. Average light load: 28.8 per cent. Average weight of passengers: 159.3 pounds. Cost with gasoline at 15 cents per gallon: 1.52 mills per person.											



road, returning to the clubhouse through Rockville Centre, Springfield and Jamaica. At some points the instructions as given by the direction sheet were in error, with the result that several cars took wrong turnings. This was not counted, however, the mileage in all cases being taken for the distance traversed whether the cars deviated or not. The official cars in several cases also left the road for the same reason. L. M. Bradley, as official checker, in the Overland, managed to keep to the road, due to a good knowledge of topography, whereas Alex-Churchward, acting in the capacity of referee, in the official Apperson car, furnished and piloted by H. W. Swetland, was a little less fortunate, and wandered off the road on two occasions, as a result of following directions. In view of the road uncertainties, the committee took a broad view of the situation, and when contestants lost their way, they were given credit for mileage made, as certified to by the observers. This is the list of officials who handled matters in such a capable manner:

**Committee**—Alex. Schwalbach, chairman; Coker F. Clarkson, Herrman F. Cuntz, A.L.A.M.; L. M. Bradley, A.M.C.M.A.



Single-Cylinder Cadillac That Made the Greatest Mileage.

**Advisory Committee**—E. P. Chalfant, A.L.A.M.; Alfred Reeves, A.M.C.M.A.; referee, Alexander Churchward, secretary Society of Automobile Engineers.

**Inspectors**—Thos. J. Fay, gasoline and fuel tanks; Joseph Tracy, cylinders and carbureters; E. T. Birdsall, ignition and cooling systems; O. A. Stranahan, weights; A. Bergman, oil supply and tanks; A. H. Whiting, tires and bearings; A. L. Westgard, pilot; starter, Fred J. Wagner.

## SOME GOSSIP PICKED UP ALONG THE ROADSIDE

**Ought to Learn to Start.**—Much amusement was caused at the starting point by the various attempts to make a fine start. Among those who helped to cause merriment was the redoubtable De Palma, who, after cranking, promptly stalled his engine. The little racing driver got out and cranked "her" again, hustling away with the laughter of the crowd ringing in his ears. He didn't mind that, however, but went ahead and won in his class, taking the heavy Fiat cab a distance of 25.9 miles and getting a score of 84,434.

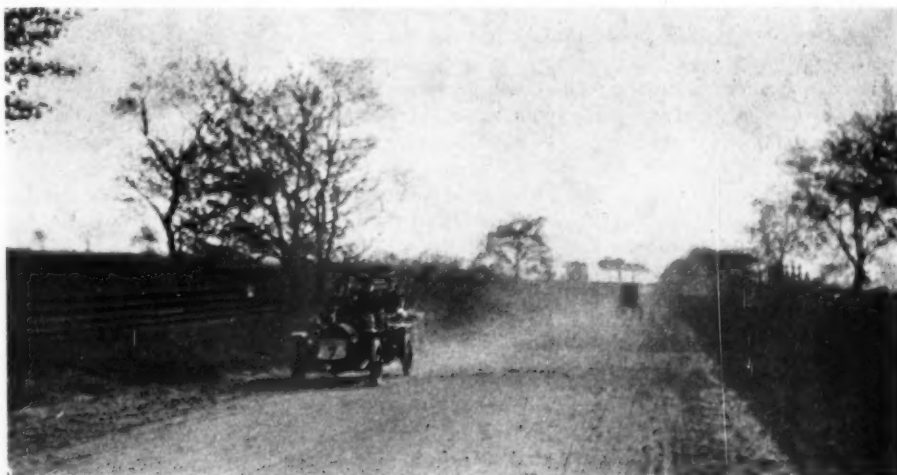
**More Initial Troubles.**—The man who started the Buick car No. 6 amused the crowd at the A. C. A. clubhouse more even than did De Palma by his starting tactics. The engine was very stubborn and refused to do business. This didn't deter the starter, who grinned and continued to wind the engine over. He must have turned that engine over for a full minute without stopping before it consented to start.

**Officials Had Their Own Troubles.**—The crowd around the scales was a very unruly one, and, in their curiosity, pushed and jammed until there was hardly room for the men who did the work. Finally, the calls of many empty stomachs took away great numbers of the inquisitives, and a squad of "bluecoats" drove away the rest. After that Starter Wagner was able to get them off with clocklike regularity every six minutes.

**Had a Bonfire to Vary the Monotony.**—The Chalmers-Detroit No. 7, Cameron, driver, had more than its share of hard luck. In crossing a bridge on Jackson avenue, which was being repaired, the workmen had a couple of 4-inch planks out overhauling them, and, at the approach of the car, dropped them right in the middle of the roadway. The car was going at a fast clip, and as the bridge is at the top of a slight up-grade it bounced over the planks with great discomfort to

the passengers. Cameron, suspecting trouble, shut off at once. When the car came to a stop the carbureter float was found to have jumped off of its seat and jammed in the off position, so that the more-than-precious fluid was flowing right enough. To stop it, it was necessary to remove the cover of the float chamber, and the gasoline overflowed. To make matters worse, this caught on fire. Luckily, a teamster was watering his horses at the roadhouse there and a pail of water taken from him bodily put the fire out before any real damage was done beyond curtailing the possible score.

**Tires Behaved Very Well.**—It is a surprising fact, but none the less true, that in all the 1,500 miles traveled by the contestants and official cars out and back, only two cases of tire trouble were reported. The official car, the Apperson, which carried the referee, sustained a puncture, as did also Chalmers-Detroit No. 19. The latter "got their's" on Jackson avenue, about eight miles out. This did not deter the car from getting second to Franklin in its class.



Chalmers-Detroit Made Fastest Time of All the Contestants.



Overland Official Car That Followed in Wake of Contestants.

**Not Many Prepared for a Real Contest.**—The fact that most of the cars "just entered" was evident from the conglomeration of "special" tanks which showed up at the start. These were of all kinds, shapes and descriptions. There were long and short, round and square, big and little, new and old, every possible kind of a tank, one competitor even going to the extent of a tank so small that it would not hold the full official gallon. By this, he lost about 10 per cent. of his fuel, equal to about two and one-half miles. Nearly all of the tanks had a square shape, which was radically wrong, as the surface should be as small as possible for the required volume, to reduce the possible evaporation to a minimum. This requirement is met by a circular tank with spherical ends.

**Lack of Adequate Directions Hindered Many.**—About the only real source of complaint on the part of the contestants was the absolute lack of signboards along the course or adequate directions. The officials distributed a folder which contained so-called directions and mileage. On this, however, distances did not check up, turns to the left proved to be turns to the right, and many road intersections were the source of trouble.

One of these, which caused much trouble, was in the official folder as: "19.4 turn right into Mineola avenue at top of hill." On this De Dion cab No. 16 went wrong, and, of course, off the course. As the three official cars, in checking up, did the very same thing, involuntarily, the cab could not well be penalized. In fact, the officials early decided not to subtract any mileage made by going off the official course. This wise decision helped a number of cars, the Cadillac, which made the greatest mileage, going wrong at Massapequa for nearly five miles.

**Some Interesting Figures Culled from the Results.**—For the benefit of the statistical shark, a few figures have been worked out from the official results. The total number of cars starting and finishing was 20; the total mileage, 476.4;

average mileage, 23.8; the total weight, 62,700 pounds; average weight, 3,135 pounds; the total score, 1,385,715 pound-miles; the average score, 69,285.8 pound-miles; the score in ton-miles, 692.86 total and 36.64 average per car. This latter figure may be compared with the recent Daimler slide valve engine tests, in which the larger car made 35.46 ton-miles per gallon, and the smaller 32.28.

**Laugh Was on the Other Fellow.**—There were many laughable instances, as where an early car had exhausted its fuel at the bottom of a hill, and every car following, which made that hill, gave them the laugh. One car was stopped just at the top of a hill about 20 miles out. When the one-lunger Cadillac came along, the occupants of the car by the wayside watched it very closely. When the Detroit product stopped at the brow of the hill, not 50 yards in front of them, they were tickled half to death and promptly gave the Cadillac crew the grand ha-ha. Their merriment was short-lived, for the driver of the Western car climbed out, cranked her over, and off they went, giving the laugh to the now sorrowful party by the wayside, whose car had reached its limit from fuel exhaustion.

## TECHNICAL COMMITTEE REPORTS ON NON-STOP MAXWELL

**B**OSTON, May 10.—Since the conclusion on April 12 of the 10,000-mile non-stop run of a Maxwell touring car around this city, a thorough technical examination has been conducted by a committee consisting of Professor Charles F. Park of the Massachusetts Institute of Technology, Charles J. Bailey, Virgil A. Charles, and James Fortescue, all local autoists of experience. The report has just been announced, dealing at length with the condition of the machine, and showing that a most exhaustive examination was made, both as to its running qualities, and as to the effect of the 10,000 miles on the different parts. The machinery was all taken down, every wearing part was carefully measured and all parts thoroughly scrutinized.

When the motor was officially stopped after running continuously for more than twenty-five days and had driven the car in excess of 10,000 miles, it was taken in charge by the committee. With the four members and a driver on board the car was driven about ten miles for the purpose of observing the general running of the machine. The route included the climb of Corey hill, the hardest grade in the vicinity of Boston, the car being sent over the hill in both directions. It was driven on the different gears, stopped both going up and coming down, and started again and backed. The committee states that the performance of the machine on this run was satisfactory, although at no time was the car speeded. For all the stops that were made, the brakes held

the car and the clutch did not slip in making the starts. One set of brakes only was used, the emergency internal expanding having been disconnected. The engine ran smoothly and knocked only when hard worked. The exhaust was regular and there was no skipping. The committee pronounced the car in apparently good general running condition.

After this the car was taken to the laboratory of the Institute of Technology and carefully examined. All the parts, with the exception of the emergency brakes, were found in proper position, no cotter pins were missing and all bolts and nuts were set up hard with the exception of one cap screw on the water manifold which was loose, the four lower cap screws of the exhaust manifold which were slack and one slack nut on the inlet manifold. The radiator and water connections were tight. The main crank shaft bearings, connecting rod boxes and pins, and wrist pins were measured; the piston rings and cylinders were bright and smooth; the inlet valve seats clean, but the exhaust valve seats were dirty and spotted. The cam shafts were measured, and also the gears. The wear on the gear teeth was barely noticeable. The push rods and guides were round and showed no wear on their sliding surfaces. All valve stems were smooth and in no case cut. The committee carefully timed the valves, examined the spark plugs, the oil and every other part of the mechanism.



# An Air-Cooler Survives Best in Harrisburg Endurance

By W. MCK. WHITE



Class A. Franklin, Carris

WINNERS OF THE RUN.				
No. Car.	Class.	Driver.	Points Lost.	
12. Franklin	A	C. S. Carris	21	
4. Pullman	B	A. B. Cocklin	56	
15. Peerless	C	Ed. Burnshaw	58	
5. Pullman	D	J. G. Goodman	315	

**HARRISBURG, PA.,** May 9.—Franklin, Peerless and two Pullmans have carried off premier honors in the third annual endurance contest of the Motor Club of Harrisburg, which was completed

end as non-contestants, and another nearly completed the course, while a convoying section of seven official cars completed the party. Scarcity in numbers was far overbalanced by the smoothness with



Class B. Pullman, Cocklin

last night with every participant suffering minus marks. Four days of strenuous touring over 694 miles of varied road conditions, with high required averages of speed and a minute examination by technical experts, combined to determine the abilities of the fourteen contestants.

Clayton S. Carris, at the wheel of a 28-horsepower Franklin touring car, scored a victory for a lightweight automobile with ample power by winning in the over \$2,250 class the trophy donated by Governor Edwin S. Stuart and at the same time accomplish the best performance by its low penalizations.

A Pullman touring car of 30-horsepower, driven by A. B. Cocklin, won the Board of Trade trophy for touring cars listing under \$2,250 and was second in line as regarded penalizations.

The division for larger roadsters, selling above the \$2,000 mark, was captured by Ed. Burnshaw, driving P. F. du Pont's six-cylinder Peerless, thereby taking the National Capital trophy.

For small runabouts, selling for less than \$2,000, the *Patriot* cup was taken by J. G. Goodman, driving a 20-horsepower Pullman, the lowest power car in the run after the first day.

Ten of the fourteen entrants finished the grueling test; two others which had withdrawn ran to the

which the affair was handled, the general satisfaction and pleasure attending the run on the part of officials and contestants alike, and the feeling that the cars which had undergone the test so successfully deserved the credit for having taken part in one of the hardest endurance contests ever held. The fact that not a single perfect score remained after the third day, because of road conditions with a schedule of 20 miles per hour, attests to the rigor of the event, and that there was not a single complaint or protest indicates the confidence replaced in the officials.

After the automobiles had been sent over the route, and before their standing was announced, Chairman of the Technical Committee David Beecroft and his assistants, Messrs. Kerrison and Wright, carried out a series of tests calculated to indicate the operating condition of the cars. They were made to jump a curb or spin the wheels to show that the clutch was holding; the brakes were tested on a steep hill; the various sets of ignition tried; the motor examined with retarded spark and open throttle, and vice versa, to see whether it would run under varying ignition and carburetion conditions; the various speeds were applied, and other means of obtaining a line likewise used. Then came a thorough inspection of motors, transmissions, fend-



Committeemen Johnston and Kerrison



Class C. Peerless, Burnshaw

ers, nuts and bolts, with penalties for looseness or breaks. The heavy fines for damaged fenders was explained by Chairman Beecroft as imposed because these parts are of so great importance in the appearance of the machines and detract so greatly when damaged.

As a result of the examination there was cause for mutual gratification, for in spite of the extreme trials cars stood the work exceptionally well and no motor was found in trouble. Winners and losers and officials joined in comparing notes, and not a single word but of praise was heard.

#### SCHEDULE OF ROAD TESTS PENALTIES.

CLASS A			
No	Car	Conditions	Points
12	FRANKLIN	Perfect	0
10	WHITE	Perfect	0
1	OLDSMOBILE	Disabled magneto	20
2	PULLMAN	Dead dry cells	2
CLASS B			
4	PULLMAN	Perfect	0
8	MAXWELL	Perfect	0
CLASS C			
15	PEERLESS	Perfect	0
3	PULLMAN	Perfect	0
CLASS D			
5	PULLMAN	One cylinder missing	1
16	MAXWELL	Perfect	0

#### RESULTS OF THE TECHNICAL EXAMINATION.

CLASS A				
No.	Car	Penalties	Points	Total
12	FRANKLIN	Broken fender flanges	2	2
10	WHITE	Broken fender iron	6	6
1	OLDSMOBILE	Broken fender iron	6	6
2	PULLMAN	Front spring, 4 leaves broken	20	26
		Broken rear axle truss rod	5	
		Broken spring bolt	2	
		Loose spring bolt	1	8
CLASS B				
4	PULLMAN	Broken muffler support	2	
		Broken brake release spring	2	4
8	MAXWELL	Damaged fenders	2	
		Water leak	1	
		Disconnected muffler pipe	1	4
CLASS C				
15	PEERLESS	Loose clutch stud bolt	1	
		Damaged fenders	7	8
3	PULLMAN	Broken spring bolt	2	
		Broken rear axle truss rod	5	
		Broken brake release spring	1	8
CLASS D				
5	PULLMAN	Damaged mud guards	2	
		Loose rear axle truss rod	1	
		Loose spring center bolt	1	
		Broken fender irons	12	
		Lost fender bolts	6	22
16	MAXWELL	Rear wheel loose	10	
		Damaged fenders	13	
		Fan belt off	2	
		Broken muffler Cut-out Spring	1	
		Loose muffler union	1	
		Spring, broken leaf	5	32

The cars were representative in nature. The Franklin showed its sturdy construction in its splendid condition; the big Oldsmobile looked like a sure winner until mud interfered; the Pullman contingent indicated uniformity with its four starters and four finishers, two of them winners, and in addition there were two Pullman official cars; the White steamer made the same consistent performance seen in previous contests, and the Peerless stood its rough trip in splendid shape. The Maxwells were handicapped, the roadster because of its accident, which delayed it materially but did not seem to injure its ability in any way, and the touring car having tire trouble which caused it to be late. A noticeable feature of the run was the steadiness of the drivers, for participating in contests is an education.

As was told in THE AUTOMOBILE last week, the event started from Harrisburg on Monday enroute to Washington, D. C., through pleasant country, over generally fair but rough roads, except for the first part, when they were very bad and resulted in the elimination of half of the perfect scores, including the withdrawal of one car. The distance was 153.2 miles. Tuesday witnessed a return to the Keystone State capital via Baltimore, York and Lancaster, a distance of 170.7 miles, over highways varying from magnificent to fair, but always passable, the streets of Baltimore being perhaps the worst part of the daily run. Two

care withdrew in this distance, and one contestant increased its penalty score. There were eleven competing at the end of the first half of the tour, but the entire party returned.

To Wilkes-Barre, 180.6 miles away, was the route of the third day, and it was this one which proved a Waterloo to every contesting and several non-contesting cars. Terrible roads, whose condition was made soft by the overflowing of the Susquehanna River, made average speed impossible, and only three cars were able to complete the run without being towed at least once. When the pathfinding party had made its tour of inspection the highways were rough but permitted a speed of 20 miles an hour, and this was dealt out to the drivers just before leaving. In the opinion of veterans like Carris, White, Berger and others in the cars, no such roads had ever been given for an endurance run, and the enlarged number of figures replacing the goose eggs on the score sheet testified to the veracity of their statements. In the entire distance there was perhaps not over ten miles of road where the average tourist would have attempted a speed of 18 miles an hour, and when there was not deep, sticky mud, there were waterbreaks that made the bodies creak as the wheels surmounted the obstructions. At Sunbury the first control, 58.3 miles, there were three perfect scores still intact and three had already been relegated to the past. Even worse were the highways to Williamsport, 34.2 miles, and there was but one perfect score, that of the Peerless roadster.

The Pullman pilot car had gotten safely by on one side, and the Peerless, ahead of its schedule slightly, took the opposite side of the road, resulting in its sudden stopping and the precipitation of one of its passengers, Charles Saunders, a Firestone tire man, into the mud. He sank above the knees, and while he was endeavoring to extricate himself Berger's big-wheeler Oldsmobile came to a standstill in the midst.

When Carris arrived a few minutes later he reconnoitered, procured two planks, for the hole was only about fifteen feet wide, and by rushing over the planks the light Franklin reached the other side and hurried on. Walter White thought that he could make it, but he, too, was disappointed, for he sank up to his hubs and in such a position that the horses secured for the Oldsmobile had to do the honors to the White first, then to the Peerless and then to the Oldsmobile. The big wheels on the Olds helped considerably, but the car sank to above the axles. The Maxwell roadster, driven by J. E. Sellers, and the Pullman roadster, driven by H. P. Hardisty, were the only ones besides the Franklin to get over the mud without equine assistance. Bloomsburg was the last intermediate control, 48.1 miles from Williamsport, and Wilkes-Barre 40 miles further on.

With all cars penalized the final day was spent in making the longest run of the tour, 189.7 miles, to Harrisburg via the Pocono Mountains, Stroudsburg, Easton, Allentown, Reading and Lebanon. Checking stations were established at Stroudsburg, 51.4 miles; Allentown, 49.2 miles; Reading, 35.3 miles, and at the finish, 53.8 miles. There was little of incident to mark the day except tire trouble, which was prevalent largely because many shoes had been weakened on the previous day and the fast speed of the last was too much for them. The Oldsmobile, with 42-inch Goodrich tires, had no trouble with them at all, the only car not halted. Wilkes-Barre autoists, and perhaps many of the drivers and tourists, were surprised and gratified by the manner Giants' Despair Mountain was taken. Every machine went up without the least bit of trouble, and the big six-cylinder Thomas used by Referee R. H. Johnston, driven by William Graupner, made the climb on third speed, with the exception of the 22 per cent grade at the top, when second was used. Only two autos were penalized for lateness, the Pullman roadster and the Pullman runabout, the former because of tire trouble and the latter because it lost its way.

Throughout the four days the interest displayed in the towns and cities through which the run passed was remarkable and greater than ever seen before. Harrisburg turned out in force each time the contest touched the city; Washington showed a passing interest; Baltimore was better and police and automobile



## SUMMARY OF PENALTIES IMPOSED ON ROAD AND IN TECHNICAL EXAMINATION, HARRISBURG RUN

CLASS A—TOURING CARS CATALOGUED AT \$2,250 AND OVER									
No	Car	H.P.	Cyl.	Piston Bore	Model	Cyl.	Driver	Penalties, Road	Technical Total
12	FRANKLIN	28	4 1/4	4	D	4	C. S. Carris	19	2
10	WHITE	40	5	5 1/4	M	6	Walter C. White	90	6
1	OLDSMOBILE	60	4 3/4	4 3/4	Z	6	T. W. Berger	172	46
2	PULLMAN	40	5	5 1/4	M	4	R. L. Morton	574	10
11	THOMAS	40	3 3/8	4 5/16	6-40	6	M. R. Graupner	Withdrew 3rd day.*	584
6	RAMBLER	45	5	5 1/2	45	4	F. W. Darnstaedt	Withdrew 2nd day.†	
*Finished as non-contestant. †Continued to Reading as non-contestant.									
CLASS B—TOURING CARS CATALOGUED UNDER \$2,250									
4	PULLMAN	30	4 1/2	4 1/2	K	4	A. B. Cocklin	52	4
8	MAXWELL	24-30	4 1/4	4 1/4	DA	4	C. E. Goldthwaite	321	4
9	WHITE	20	...	...	O	...	W. B. Rheineck	Withdrew 1st day.*	325
*Continued to Harrisburg, 2nd day, as non-contestant.									
CLASS C—RUNABOUTS CATALOGUED AT \$2,000 AND OVER									
15	PEERLESS	50	4 3/8	5 1/2	25	6	Ed. Burnshaw	50	8
3	PULLMAN	40	5	5 1/4	4-40	4	H. P. Hardisty	376	8
CLASS D—RUNABOUTS CATALOGUED UNDER \$2,000									
5	PULLMAN	20	3 3/4	3 3/4	L	4	J. G. Goodman	292	23
16	MAXWELL	24-30	4 1/4	4 1/4	K	4	J. A. Sellers	658	32
7	MIDDLEBY	25	4	4	D	4	E. B. Hume	Withdrew 2nd day.*	690
*Finished as non-contestant.									
OFFICIAL CARS									
THOMAS	70	5 1/2	5 1/2	6-70	6	Wm. Graupner	Referee		
PULLMAN	30	4 1/2	4 1/2	K	4	Watt Davis	Patrol		
OLDSMOBILE	40	4 3/4	4 3/4	D	4	C. R. Misner	Chairman		
PULLMAN	40	5	5 1/4	M	4	C. C. Cumbler	Pilot		
STODDARD-DAYTON	45	4 3/4	5	9-F	4	Cox Auto Co.	Patrol		
MAXWELL	24-30	4 1/4	4 1/4	DA	4	A. Redmond	Press		
RAMBLER	32	4 1/4	4 1/4	34	4	J. A. W. Brubaker	Patrol		

club courtesies tendered, the Automobile Club of Maryland giving each tourist a box lunch, with a buffet at work in the club rooms; all through the route of the second day the roads and towns were lined with spectators. Hanover and York have had a number of contests pass through and the townspeople are enthusiastic about them, the police forces turning out to keep

the course clear. Sunbury, Williamsport, Bloomsburg, and in fact all of the cities on the third and fourth days, showed considerable crowds, while on the roadside a great many autos were parked, this being especially true on the hills. The automobile clubs of Williamsport, of Wilkes-Barre and of Allentown had receptions, Williamsport and Allentown giving lunches.

## GLIDDEN PATHFINDER NEARING END OF THE ROUTE

SOMEWHERE out in Colorado the E-M-F Glidden Pathfinder is preparing to start on the last leg of the most strenuous experience with which the veteran Dai H. Lewis has ever been identified, according to the cheerful admissions of that even-tempered mortal.

What with Michigan muck, Wisconsin clay, Minnesota gumbo and Iowa mushawa, there has been no lack of variety in the matter of roads. Dull minutes were the exception, for when you pile out of a machine, carry fence rails to make a foundation so that a car stuck in gumbo can extricate itself, battle with rain and snow over roads that are impassable for teams, and where farmers decline to lend a hand for fear of injuring their horses, there is little danger of anyone going to sleep by the way.

Wisconsin furnished the greatest obstacles to the pathfinders,

who struck the Badger state just at a time when the bottom had dropped out of the roads. It is one of the peculiarities of the middle Western States that the roads are at one extreme or the other. In the early spring, they provide a horrible example of what should not be. By midsummer they delight the autoist.

Minnesota was a close second, and it would be difficult to imagine tougher roads than were encountered by the pathfinders, who were able at times to make only thirty miles a day.

Once the Iowa line was crossed there came a change. Leaving Algona, the pathfinders encountered good roads for the first time in two weeks, making the ninety-five miles to Jefferson without an effort. At Jefferson, the Studebaker escort car sent out by the Denver Automobile Club was waiting, and the 130 miles to Omaha was negotiated with ease.



How the Crew of the E-M-F Glidden Pathfinder Had to Build a Bridge for Passage Near Blue Earth, Iowa.





# Automobile Gasoline and Other Available Fuel

By Thos. J. Fay

Part V

IN four-cycle motors as the mixture from the manifold enters the combustion chamber, if the scavenging question is adequately handled, there will be little or no "spent" gas in the space. The one great claim for four-cycle motors is that involving complete scavenging, for, since there are three idle strokes out of every four, the disadvantages are so very great that it is necessary to realize in some one direction in order to strike a satisfactory balance.

When it is said that there are three idle out of every four strokes of the piston, account must be taken of the power losses during the three (so-called) idle strokes. During the four cycles the following holds:

(A) Suction follows the first down stroke of the piston and the mixture is "inspired."

(B) Compression, due to the return stroke, when the inspired mixture is compressed.

(C) Power-stroke, when the compressed mixture is ignited and expanded.

(D) Exhaust, when the spent products of combustion are expelled, partially, by virtue of the remaining energy in the gas as indicated by the terminal pressure, to some extent as a result of inertia, and for the balance by the piston sweep, which serves to positively displace all but the compression space in the cylinder.

**Factors Influencing the Situation.**—That the power stroke will not always result in the same delivery of power is so thoroughly well established as not to require long discussion, yet even so, the extent of the variations, coupled with the reasons why, might be of value at this time.

Take, for illustration, the character of the mixture; if it is charged with spent products of combustion the result will not be so good, for the reason that the weight of fuel will be less and the oxygen will be isolated in such a way that the rate of flame propagation will be retarded. If scavenging is not well cared for, this lack of a regular supply and intimate intermingling of the oxygen with the fuel will act much the same as a retarded spark, in that the explosion will be delayed and the energy will be expended in the muffler instead of for the intended purpose, which is to energize the piston with the expectation that the same energy will be passed on to the connecting rod, thence to the crankshaft, clutch, transmission, axle, wheels, to react at the point of contact of the tires with the ground for the purpose of driving the car. If the scavenging is incomplete it is not so easy for the average motorist to discover that the compression may appear to be good, the motor may perform all its functions with good regularity, and may even deliver a measure of power. The same motor may perform lazily and the actual power may be considerably below the "rating," according to accepted formula, in view of the piston displacement per cylinder per second. Incomplete scavenging, then, is a fuel problem of the first magnitude, since if the scavenging is not good the fuel will be deficient in quantity and the combustion will be imperfect. True, the question of combustion is one to be given attention under the head of ignition, yet, even so, ignition itself is but a detail in the problem of the fuel.

The ills of incomplete scavenging will best be appreciated if account is taken of the trouble that follows in any attempt to crank a motor after it becomes fouled. Autoists in general fully appreciate the difficulties involved in cranking when the mixture is not right, and they invariably sweep the cylinders clean of the foul mixture before they try to crank; moreover, they "prime" the motor to assure an adequate supply of fuel. If this same trouble will be considered as present in a motor that does not scavenge completely, even if it does run, the truth will be present to a marvelous degree, and the power of such a motor will be much increased if the scavenging question is attended to.

**Valves Should be Properly Timed.**—If the valves do not open and close at the right time the result will be just the same as that due to the failure of any valve placed on any machine for the purpose of control of a liquid, gas or even a solid. In view of the nimbleness of gas under pressure it is necessary to take into account the advantage of precise timing, particularly as the troubles of scavenging will abound, to some extent, even if the timing is done with the utmost precision. This scavenging problem is involved in several ways, as follows: (a) the terminal pressure, which, in the average motor, is not far from 30 pounds per square inch; (b) the ratio of the area of valves to the area of pistons; (c) the relation of valve openings to stroke of the pistons; (d) the relation of valve closing to the stroke of pistons; (e) the time the valves are kept open; (f) contour of ports; (g) speed of piston, etc. These are all matters outside of any question of timing the spark, and no account is taken of the compression, which is quite a separate problem. In a general way the results that have to be taken into account will follow conditions as follows:

(A) Work will be done in the process of compressing the new charge in every successive compression stroke in amount as indicated by the increase in temperature, influenced by a secondary increase in pressure, induced by the heat of compression, according to the usual formula.

(B) With a fixed compression space, in view of a given sweep of the piston, the heat of compression and the compression pressure will be a fair measure of the efficiency of the valves and the remaining controlling factors.

(C) Heat is lost to the water jackets, so that this source of loss will serve to modify the curve of compression, and the actual result, due to the fuel, will be diminished to whatever extent heat units are tapped away to the cooling medium.

(D) If the piston rings are not tight some of the mixture, during and after compression, will be lost. Any work done in compressing gas that leaks by the rings will be dissipated and all the gas that leaks by will be as fuel wasted as well; this leakage, then, represents a double loss.

(E) If the valves are not tight there will be a double loss due to leakage by them, primarily, because power will be taken to compress the gas as it leaks by the valves, and, again, the fuel value will be reduced since there will be less of it in the combustion chamber at the time the charge is ignited.

(F) The greater the surface of the cylinders exposed to

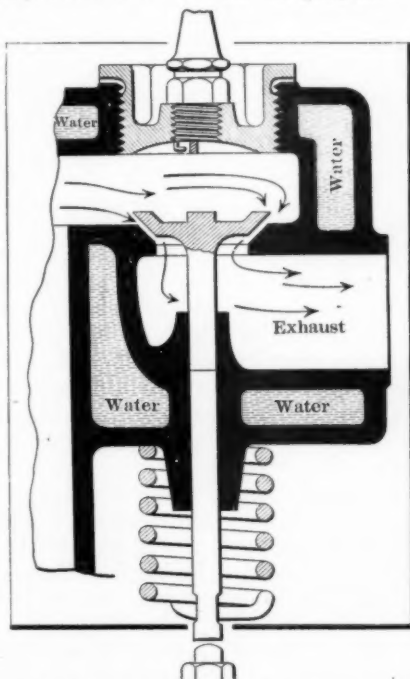


Fig. 22—Improper design, showing water jacket around one side only of the valve seat, thus causing deformation.

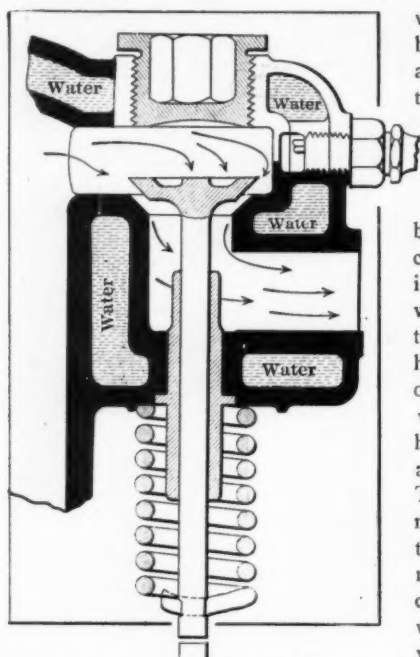


Fig. 23—Proper design, showing water jacket all around the valve seat, so that the temperature is uniform.

water, the greater will be the loss to the water, and the best dome for the cylinder head is the one that offers the least surface.

(G) The greater the temperature difference between the gas in the cylinder and the water in the jacket, the greater will be the loss due to this process, and the higher the temperature of the jacket, the more will the gas be rarefied, hence reduced in weight, as it enters the cylinders. The actual power of any motor is proportional to the actual weight of fuel reduced to finality, viz., carbon-dioxide, water-vapor and nitrogen, which later content is not altered in the process.

(H) If scavenging is incomplete, the residuum of highly heated products of combustion will increase the temperature of the incoming fresh charge, and the weight of fuel in the charge will be reduced in consequence.

(I) High piston velocity has the effect of decreasing losses to the water-jacket, since the time the compressed charge is exposed to the cooling influence is reduced.

(J) Shortening the stroke has the effect of increasing fuel efficiency in that the losses to the jacket will be less, since the speed of the motor may be high—relatively—and the time the charge will be exposed to the cooling medium will be reduced; on the other hand, the terminal pressure will increase as the stroke is shortened, and as this terminal pressure increases, so do the losses. Between these influences, then, a balance must be struck.

(K) If the fuel has to be vaporized in the cylinder rather than before it enters, it is a loss that will be experienced, for the reason that the latent heat of evaporation of the liquid fuel must be reckoned with.

(M) If the cylinder surfaces are coated with carbon, or any other "crust," the heat transfer will be interfered with, and the result may be a loss due to the rarefying effect, although in some cases this same crust may serve to limit the heat that will pass to the jacket, and a gain may result. This is not desirable on the ground that the crust will not remain at a constant thickness, hence it does not represent a stable condition.

(O) In general practice it is considered that the pressure due to ignition and combustion is about four times the pressure due to compression. It is theoretically possible to calculate for both compression and final pressure, although, in practice, the losses to the water-jacket and from other causes are so variable that the results of such calculations fall short of any very practical value.

(P) Obstructions in the passageways, as in the manifolds or in the muffler, are followed by loss of power, due to an inefficient heat transfer on the one hand and to bad scavenging on the other.

(Q) If the law of inertia is to be taken advantage of, the manifolds must be so designed as to conform to the requirements. This means that the gases must travel in one direction only, and that the properties of the "Venturi" tube, and even syphon effects, might well be present in the manifolds.

(R) The shape of the valve seats will influence the situation in that the effective area depends upon shape, to some extent.

(S) Valves in the dome of the combustion chamber would seem to be advantageous in several ways, among which directness is a factor. It may be that valves, so located, will warp sooner because they are in the most direct heat and the blow they will receive, in this position, is of some moment.

(T) Against placing the valves in the dome is the question of lost motion in the valve mechanism, brought about by the inaccessible position, which lost motion is very prone to interfere with correct timing. Even this trouble will fail to render itself manifest if the mechanical work is coupled with good design to an extent sufficient to be able to say that harmony is present.

**Details of Design That Influence the Situation.**—Valve trouble, for illustration, is a very serious reaction against permanent and efficient performance, due in a large measure to warping, which, in the face of good valve design and proper materials, follows inferior water jacketing, as shown in Fig. 22. In this example, as the illustration depicts, water circulates around for a portion of the valve seat only, and heated exhaust gases contact with the seat for a considerable distance of the arc of the circle that bounds the same. In some attempts to save weight and to reduce the height of motors this practice was introduced, and it is not uncommon to have the valve seats crack in consequence of unequal expansion.

But even if the valve seats do not actually crack, they do, at least, deform so that leaking is the normal expectation despite all attempts to grind the valves to a tight seat on a permanent basis. Fig. 23 illustrates a more perfect design, in which it will be observed that the water jacket extends all around the valve seat, and the temperature holds at a constant level in all portions of the seat metal, and the valves are also maintained at a constant temperature.

In Fig. 23 the contour of the port, under the valve seat, is rather abrupt and to some extent the gas is retarded in its flow, which is a matter of moment in that complete scavenging is scarcely to be expected. Fig. 24 portrays a better condition, since the port is curved and an easy passage of the gas is therefore assured. There is one other point to be discussed, viz.: Fig. 23 shows a bushing in the casting, placed to serve as a bearing for the valve-stem; this bushing will get much hotter than the surrounding metal for the reason that the joint will not conduct heat away as well as in the case of a continuous wall of (integral) metal, as shown in Fig. 24.

**Aspect of the Automatic Inlet Valve.**—If a motor is to run well at low speeds there is reason for selecting the automatic type of inlet valve, an illustration of which is offered in Fig. 25. The illustration depicts the condition of the gases just after the closing of the exhaust valve, which is mechanically operated, and the automatic inlet valve is disclosed, opened, with the mixture flowing in, as indicated by arrows. This cannot be true in practice, for, as the exhaust arrows show, there is a pressure, due to inertia of the exhaust gases, tending to keep the automatic inlet valve closed. The inlet valve cannot open until the inertia energy of the exhaust gases is spent, nor even then, before the piston dis-

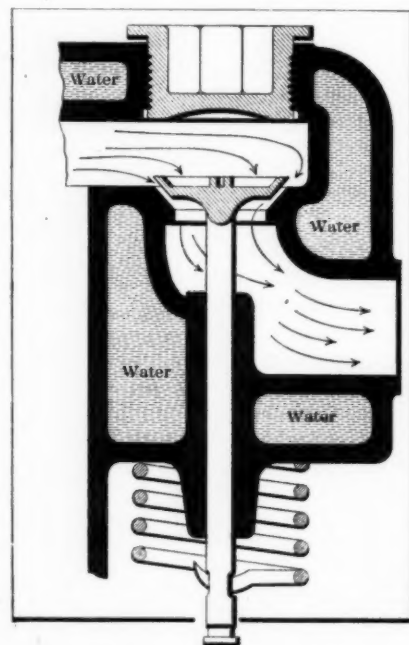


Fig. 24—Unbushed valve stem and curved port below the valve, which materially aids in scavenging the cylinders.



places enough volume to induce an adequate vacuum. As a consequence there is quite a period of time during which the inlet valve remains closed when it ought to be opened.

In some cases the automatic inlet valve gave trouble due to the valve springs, which were covered up (housed in) and the heat that could not readily escape drew the temper of the springs. In this class of work the spring has to be delicate, and unless a means is provided to make adjustments, as the temper is drawn, it is a moral certainty that the results will be unsatisfactory. In any event it should be possible to quickly withdraw the valve and its seat so that the grinding operation can be readily performed. The illustration, Fig. 25, depicts the mechanical principle with this idea involved, but, as before stated, heat cannot be drawn off so readily if it has to pass through the air-gap between the valve housing and the cylinder proper, which trouble cannot easily be avoided under the circumstances.

In view of the limitations imposed by automatic inlet valves they should be regarded as obstructions in the path of the mixture, excepting perhaps at the lower range of speed, under which conditions it may be an advantage to use them. True, with the springs nicely proportioned, and if the valves are light, provided the valve-stem bearings are good, with ample clearance to guard against sticking, due to heat changes, an expert can get good results out of this type of valve.

**Valves Should be as Large as Possible.**—If the mixture is to get into the cylinders in the short time available, it will be through the use of valves big enough for the purpose; this takes into account proper timing. The largest valve to use is the largest that the mechanical design will admit of, allowing for the ills of heat, shock, etc. In some cases it is the practice to use larger inlet valves than those for the exhaust on the ground that the heat is not so severe on the inlet side; and there is something in the contention that the inlet pressure is not so high as the exhaust, so that the inlet valves might well be larger from this point of view.

It is not uncommon in practice to see valves of a diameter equal to half the diameter of the pistons of the same motor, and this practice prevails in motors even up to 6 inches bore of cylinders. When a valve exceeds 3 inches, however, it is rather difficult to keep it from warping and the design must be very good, indeed, if warping is not to be a factor.

Fig. 26 depicts a valve of almost 3 inches in diameter, which valve has been used for several years in two or three well-known makes of motors, without any change at all, and it has the advantage of working for a long time without warping, so that the question of grinding, in these cases was reduced to a minimum.

The figure affords all the dimensions required in the making of the valve, and it will be observed that the design is very light, so that opening and closing should be without sluggish action. The spring used in conjunction with this valve required a pressure of 35 to 42 pounds to compress to the normal position for the best results. As will be observed, the radius of the stem, where it verges into the head, is liberal, although the head itself is rather light, shaped, however, to afford a good measure of rigidity. The materials used in this valve were high nickel steel, in which the nickel content was 35 per cent in most cases. In some valves made to this shape high carbon steel was used, in which the carbon content was 1.15 points.

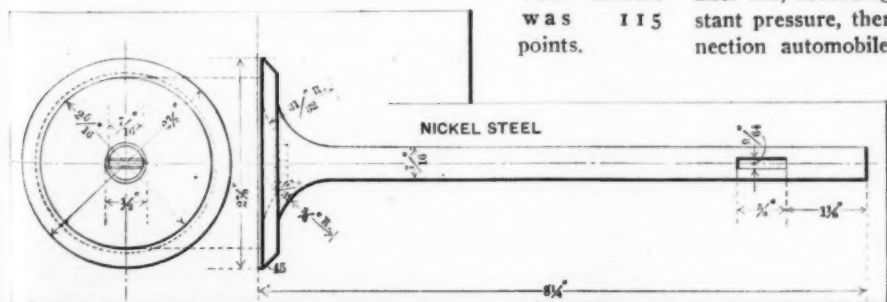


Fig. 26—Valve of big diameter, so shaped that it will not warp in the heat of the exhaust.

Results were good, which is an indication of the adequacy of the design, thus largely eliminating the question of material.

Compression is necessary if the power of a motor is to be maximum, but there is a limit to the amount of compression, in practice, if the best results are to be realized. The difference between modern automobile motors and the earlier types lies largely in this same compression, for, as the history of the internal combustion motor will adequately disclose, the first designs were without compression, and the results were far from good. The earlier experimenters, in quest of perfection, finally hit upon the idea of compressing the charge, and it was then found that (despite the power lost in the compressing process) an actual increase in power was realized.

The allowable compression has always been a "bone of contention," due to lack of understanding, or disregard, of the limiting factors, or failure, on the part of the different investigators, to make tests, under similar conditions. The actual gain as a result of compression, while it is not proportional to compression, is enough to take advantage of up to the practical limit, and this limiting factor is bounded by what is called "pre-ignition." The fuel will ignite, in the absence of a spark, on the compression stroke, if the compression is increased sufficiently, and the pressure due to compression, such as will bring on preignition, will be lower if the cylinders are hot than will be required if they are cold.

When gasoline—proper—was the fuel to be had for automobiles, preignition was easily brought about, for the reason that the fuel was more readily ignited than it is when "automobile gasoline" is used for fuel. Plainly, then, the allowable compression depends upon the composition of the gasoline, and any discussion that fails to take into account the makeup of the fuel is without force.

**Latent Heat of Evaporation Must Be Considered.**—As a manifestation of "latent heat," the sensible temperature of a liquid remains stationary at its temperature of ebullition until all the liquid is evaporated, after which "superheating" will follow the further application of heat. If the evaporation is under one atmosphere of pressure, the sensible temperature will be that to correspond, and if the pressure is changed, the temperature will alter too, accordingly. If heat is not applied, considering a constant pressure, there will be no sign of boiling, and in this connection automobile gasoline is no exception to the rule. The heat should be applied to the liquid gasoline, and not to the vapor of the same, after evaporation. This is a matter that should be taken into account in the design of the fuel system, and it happens to be the case that, from the point of view of efficiency as well as economy, the amount of heat should be regulated to suit the requirements, considering all the circumstances.

(To be continued.)

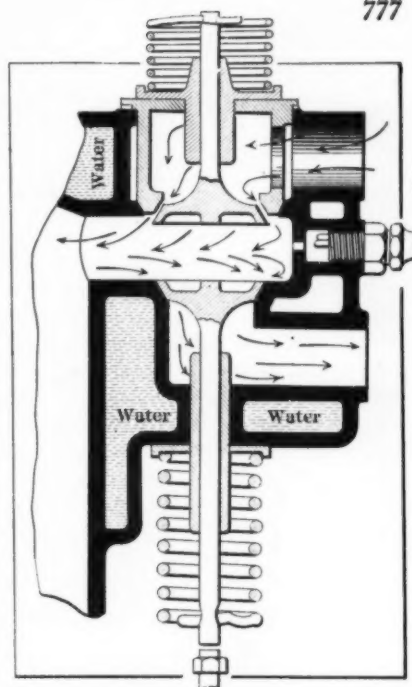


Fig. 25—Automatic inlet valve, which serves as an obstruction to the mixture, especially at high speed.

## THE WORLD AS AN AUTOMOBILE MART

**I**F any of the American manufacturers, who will this year produce over 60,000 automobiles, are not satisfied with the support accorded in their home country, they have only to look elsewhere for a market, as the whole world is an automobile mart to-day. Not alone for light pleasure vehicles is the demand very strong, but also for heavy trucks, and even for the lighter trucks which come midway between the two others.

As knowledge of the workings of the mechanism permeates and as the possibilities of the machines become better known, the countries most in need of transportation facilities are offering the greatest opportunities for future expansion. The United States consuls in the various foreign countries have been instructed to report at frequent intervals anything pertaining to opportunities of this sort. Consequently, the reports follow one another with unfailing regularity, telling of chances for American machines in those countries.

### Taxicabs in Johannesburg.

Consul Edwin N. Gunsaulus reports as follows concerning the use of taxicabs in the Transvaal:

The introduction of taxicabs into Johannesburg by a company organized for the purpose is now an accomplished fact, despite the opposition of cab owners, who protested in a petition forwarded to the town council, signed by 600 of their number. Recommendations respecting the license and fares to be charged have been adopted, it having been decided that, subject to the Government's approval, the license fee for each taxicab should be fixed at 15 pounds (about \$73) per annum, and that the tariff of fares should be the same as the ordinary cab fares, excepting for time engagements, in which case it will be 10 shillings (\$2.43) instead of 7s. 6d. (\$1.82) per hour. The existing cab tariff for first-class cabs is 24 cents per mile each for the first two passengers and 12 cents for each additional passenger, and includes five minutes' waiting without charge. For detention over five minutes 48 cents for each fifteen minutes or fraction may be charged. It was shown in the report that it would be necessary to amend the traffic by-laws by making the half-yearly license for taxicabs \$36.50 and altering the tariff as follows: For conveying one passenger (a) any distance traveled not exceeding 1 mile, as measured and indicated by the taximeter, 24 cents; (b) each succeeding half mile or any part thereof, 12 cents. Where two or more passengers are conveyed, a full fare may be charged for the first two passengers and an extra half fare for every passenger beyond two. By time, for the first hour or part thereof (irrespective of the number of passengers), as indicated by the taximeter, 10 shillings; for each additional fifteen minutes or part thereof, 2s. 6d. (61 cents.)

### Not Much Demand in Eastern Siberia.

Consul Maynard, of Vladivostok, reports concerning automobiles as follows:

At present there is no field for automobiles in Eastern Siberia. A few years ago there were a few, but on account of bad roads and steep hills, they proved to be failures. There are numerous motor boats in use now, and their use is increasing, so that in the very near future, internal combustion motors will be well understood. At that time, a powerful hill-climbing car would do very well, providing it could be run on kerosene, as this is abundant, while gasoline is very scarce.

### Excellent Opportunities in Mauritius.

In reply to inquiries, Consul Samuel C. Reat, of Port Louis, furnishes the following information concerning the automobile trade in Mauritius:

Although a small dot in the Indian Ocean, Mauritius has between 75 and 100 automobiles, mostly French and English makes, there being but one American machine in the island. The roads of Mauritius are almost equal to the best metropolitan boulevards, and it may be called the autoist's paradise, for there is neither State nor town law in regard to speed limit. The number of machines will be increased considerably by this year's purchases, and American machines costing \$500 to \$1,000, or even higher-priced cars, might supply a part of the demand, if American manufacturers would meet French and English competition. That competition is neither in mechanism nor price, for in both it is generally conceded the American manufacturers have the advantage; but the French and English competition, which must be met, is the consignment of cars to authorized representatives or to responsible

parties with the privilege to make a reasonable test of the car. This method appeals strongly to the prospective buyer, and is so generally known as to preclude negotiations in any other way.

After several American cars have found their way among the people and their merit becomes recognized, it might not be necessary to continue the consignments of cars subject to approval. The consulate believes that if a few American cars were introduced here, the demand would increase steadily, so that in a brief period they would be as well known as either the French or English machines.

### Trucks Wanted in Northern Syria.

Consul Jesse B. Jackson, of Aleppo, furnishes the following information concerning the introduction of automobiles and motor trucks into northern Syria:

A concession has been recently granted by the Government to a local company (name on file at Bureau of Manufactures) for the right of transportation within this consular district of freight and passengers by automobiles. As the outcome of the enterprise is more or less problematical, it has been decided to proceed cautiously at first, following which two second-hand machines have been purchased in Egypt. One is of the large touring car variety, suitable for seven passengers, while the other is a motor truck of 10,000 pounds' capacity. The roads over which it is expected to operate are not in first-class shape, and the climatic conditions are such that it is not thought possible to be able to work the entire year, as the heavy winter rains render the roads almost impassable for two or three months during that season. The prospects appear favorable for the purchase of a number of cars in the near future, a matter which should have the careful attention of American manufacturers of such machines. Comparison will be made by the company of the construction, capacity, cost, and probable durability of the American-made machines with those manufactured in Europe, especially in France.

If American exporters should be able to induce this company to purchase one or more cars, it will serve as an entering wedge, and other sales will undoubtedly follow, not only to this society, but to private parties, a number of whom will no doubt purchase automobiles in the near future. Means of communication have heretofore been limited to carriages, horses, camels, and donkeys, and the people are now convinced that such ancient methods cause costly and unnecessary delay, which, in the absence of railways, can only be overcome by the use of automobiles.

Special attention should be given to the introduction of cheap cars, as the question of price is all important. However, quality should not be sacrificed, as to put inferior cars on the market would only react upon American manufacturers in the future and make success but temporary. All cars to be used by the above-mentioned company will be purchased direct, but American dealers who expect to supply the public should take up the matter with the various commission houses of Aleppo, a complete list of which is on file in the Bureau of Manufactures. In order to more effectually appeal to local conditions, catalogues showing all particulars of construction, prices, etc., should be printed in French.

### Fine Roads Influence Passenger Installation in Mesopotamia.

Consul Magelssen reports that there is a good field for cars in the Mesopotamian region of Turkey.

A director of an American firm recently completed a trip from Aleppo to Bagdad, with a specially built car, which was the first to ever pass through that region. The trip was made in safety, occupying seven days, and demonstrated the feasibility of the operation of a motor-car service between those two points.

The trip was made in the interest of a large company which will purchase a number of heavy cars to run between Khanikin, on the Persian frontier, and Kerbela, via Bagdad. The promoters are prominent residents and have already subscribed 1,400 of the 4,000 shares of stock.

Kerbela is the holy city of the Shi'ite sect of Mohammedans, and thousands of pilgrims visit it every year. The majority come by horseback, on foot, in sedan chairs, and otherwise from Persia, Russia, and the Afghanistan and Turkestan countries. Many of them spend months on the route, which, with the establishment of an automobile service, could be reduced very materially to the great benefit of the service, financially. Thus the trip from the Persian frontier to Kerbela, which now takes eight days, can be covered in a machine in as many hours.

In Turkish Arabia and Mesopotamia, where no railroads exist nor any wagon roads, automobiles could be employed to good advantage. The country is perfectly smooth and level; in fact, the American found it as good as most traveled roads at home.



# LATEST IDEAS *From* FRENCH FACTORIES

*By W.F. Bradley*

PARIS, May 7.—Since Charles Y. Knight achieved fame by convincing the Daimler engineers of the value of his sliding valve engine, other inventors have been at work endeavoring to find a substitute for the poppet valve. One of the most interesting of these creations has been produced at the Anzani factory, presided over by the young Italian engineer who ten years ago was only known as a daring racing cyclist, and a little later as a more daring motorcyclist.

Instead of a double sleeve within the cylinder, Anzani has conceived the idea of a cylinder with a hemispheric combustion chamber, having a groove right across its head opening into a tube, cast with the cylinder, in which are also two other ports, one communicating with the inlet pipe and the other with the exhaust pipe of the engine. A steel roller, cut through from side to side and along almost its entire length, fits into the tube and according to its position can fulfil the four functions of the internal combustion motor. Thus, starting with the roller valve in such a position that its single opening corresponded with the inlet port in the tube, and the admission port into the cylinder, a charge of gas would be drawn in. On the roller valve advancing the inlet port would be closed by the full face of the roller, at the same time as the closing of the entrance to the cylinder.

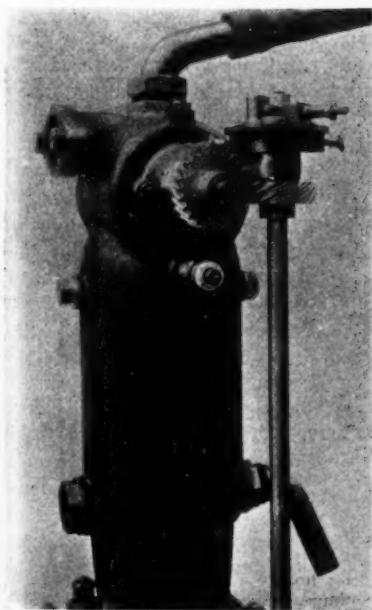
While the charge is being compressed and fired the roller valve is revolving at half speed of the engine shaft, but it is not until near the end of the explosion stroke that its single opening has uncovered the exhaust port, allowing the spent charge to escape. On the next downstroke of the piston the roller valve has uncovered the inlet port and a charge of fresh gas is being drawn in through the opening which served for the expelling of the hot exhaust gases. The obvious advantage of this is that the roller valve is continually being cooled.

The valve, however, is not left entirely to the fresh charge for its cooling, the chamber in which it revolves being surrounded by a water jacket and cooled in the same way as the cylinder walls. In one of the illustrations the inlet port is clearly shown; the exhaust port cannot be seen, but its position can be accurately judged from the external appearance of the cylinder

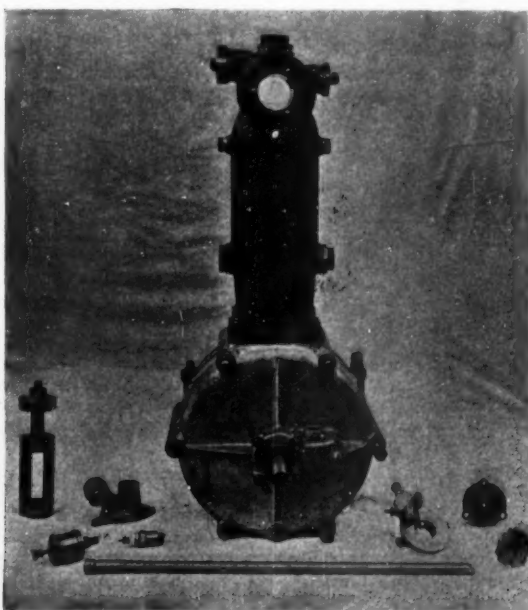
head. The passageway into the combustion chamber is likewise invisible in the photograph, but it is immediately above the spark plug, of the same length as the inlet and exhaust ports, but only half the width across; thus as the roller shuts off either the inlet or the exhaust port, the connection with the interior of the cylinder is not closed immediately, allowing the entrance or escape of gases remaining in the passageway.

The practical application of the principle does not present any serious difficulties. The casting is rather more complicated than for the ordinary type of cylinder, but cannot be considered difficult for foundries capable of turning out four and six cylinders in one block. The command of the roller is also a matter that has been carried out with a remarkable degree of simplicity. A helicoidal gear off the mainshaft, a vertical spindle, near the head of which is a pinion meshing with the helicoidal on the end of the roller. The brass plate which serves as end bearing for the roller valve also carries the bearing for the vertical spindle; the opposite end of the roller is carried in a plain bearing composed of a bronze plate mounted over the end of the tube. The vertical spindle also carries the contact maker, which on this model is of the simple make and break type, thus further simplifying the engine. The position is excellent for the make and break, for it is accessible for adjustments and cannot be reached by oil escaping from bearings.

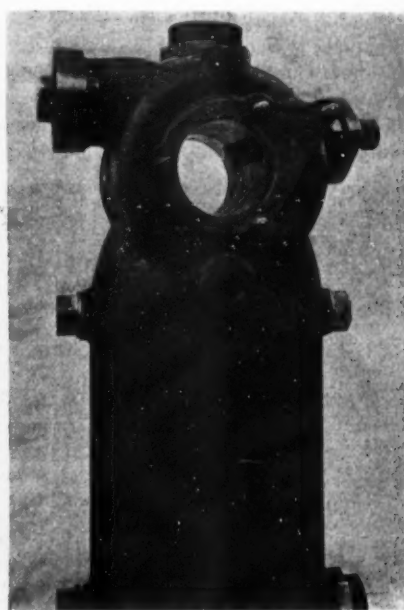
The engine illustrated is a single cylinder of 3.9 inches bore by just a fraction under 10 inches stroke (exactly 250 millimeters) built for service on a racing car in the next Voiturette contest. Up to the present, only bench tests of the engine have been made, but they have been sufficient to show that the principle is right. Enormous valve area can be obtained without any of the inconveniences of warped valves prevalent with large poppet valves, the roller valve is perfectly gas tight, its parts are easily lubricated, and the roller valve can be dismantled in very much less time than any poppet type of valve. Its application to a multiple cylinder engine is no more difficult than its adoption to a single cylinder engine, the best plan doubtless being to have a separate roller for each pair of cylinders. The



How roller is fitted and operated.

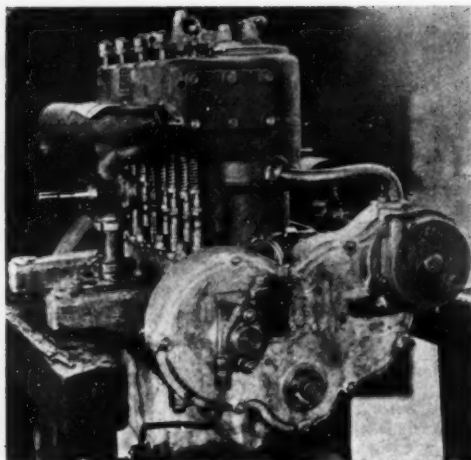


Engine with valve mechanism entirely dismantled.

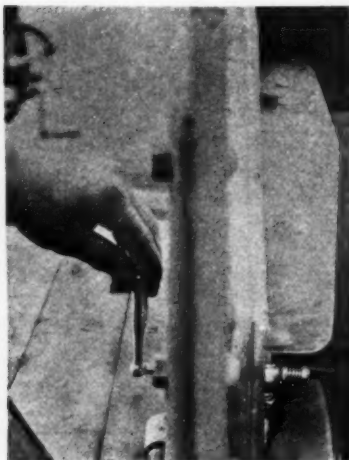


Top of cylinder with valve removed.

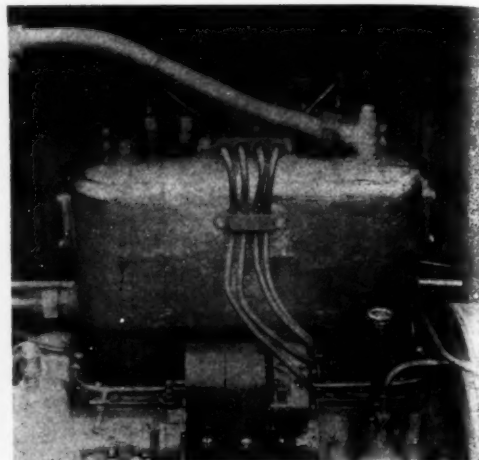
Some Details of the Anzani Motor, with Hemispheric Combustion Chamber and Single Roller Valve.



View showing oil and water pumps.



Reserve oil tank on dash.



Magneto side of the Unic motor.

**Unic (Georges Richard) Compact Four-Cylinder Motor, Designed Especially for Taxicab Work.**

performance of the engine will be watched with interest in the voiturette race which is scheduled to be run on June 20.

**Small Bores and Long Strokes.**

French constructors, encouraged by the numerous races for single cylinder cars, have developed a type of engine of but 3 9-10 inches bore which will develop no less than 30 horsepower and give a speed on the level of 60 miles an hour. When this year's voiturette races were announced bore was not rigorously limited to 3 9-10 inches, with stroke unfettered, as in previous years; but manufacturers were given the opportunity of increasing their bore to 4 7-10 inches, on condition that the stroke did not exceed the same dimension. If it was preferred to stick to the minimum bore of 3 9-10 inches, the stroke could not be carried beyond 9 4-5 inches, this being considered by organizers the practical limit of the stroke.

In every case constructors are of the opinion that they can get better speed results by sticking to the small bore of 3 9-10 inches and the long stroke of 9 4-5 inches, and in the next race there will be more engines of this type than ever before. Last year Sizaire Naudin was the only one to adopt the 9 4-5 stroke, and had as their reward the winning of the race. This year their strongest rival has, among others, gone to these extreme dimensions. As a hemispheric combustion chamber is always employed, with valves in the head, the long strong engine becomes abnormally high, and if fitted with the usual type of radiator would have a greater wind resistance than many a Vanderbilt Cup racer. In order to reduce this the bonnet is gradually narrowed in until it is about six inches across at the front, and the radiator is composed of two rows of plain copper tubes, placed lengthwise and not across the frame. A tank collects the water at the head and base of the tubes, the upper

one having a pointed end in order to offer the least resistance possible. Viewed sideways, the bonnet is enormous, and to the uninitiated must cover at least a 100-horsepower racing engine. From the front the appearance is no less wonderful, for the mechanic, stretched on his back, is entirely hidden, while the driver only shows the upper portion of his face.

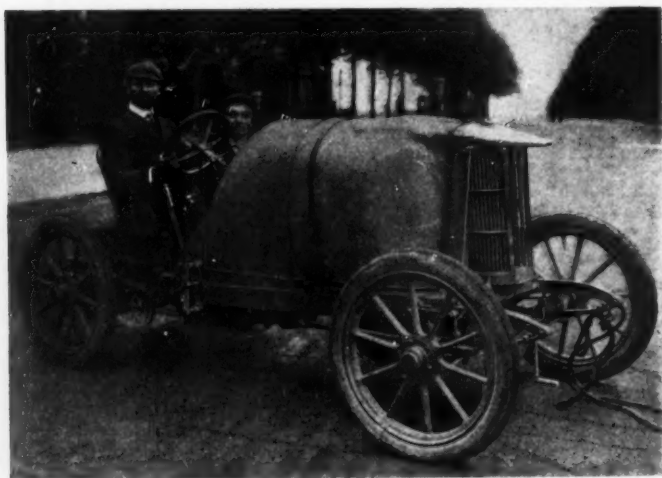
On the Sizaire-Naudin, the most successful of this type of engine, the reciprocating parts are made abnormally light, the piston has but one ring and engine lubrication is entirely by castor oil. Georges Sizaire uses castor oil not only on the racers, but on the stock cars with which he travels around the country in order to take part in various competitions.

**Close Attention to Perfect Lubrication.**

So much rigor is shown by the Paris police against automobiles with smoky exhausts that constructors have of necessity been obliged to pay close attention to matters of lubrication. An improvement in this connection has been made by the Unic company on a new four-cylinder single casting engine intended for taxicab work. The lubricating plunger pump, worked off the camshaft, draws the oil from the reservoir in the base of the crankchamber and carries it to the two end bearings of the mainshaft, which is pierced, to allow the passage of the oil through to the connecting rod bearings. The unscrewing of a single nut on the pump cover allows of the withdrawal of the pump spring, permitting a change in a few seconds.

To provide against occasions when too great a supply of oil has been fed, the oil lead to the crankcase bearing is fitted with a tap, by means of which any excess can be drained off immediately, the engine pumping the oil through the tap instead of to the main bearings.

It is frequently found that through negligence the cock admitting oil from the reserve tank to the crankcase is left open, causing the flooding of the case. This is frequently done by washers, who open the tap inadvertently, with the result that the driver finds a gallon or so of oil in the case when about to start out, and has either to stop and empty it carefully or run the risk of attentions from the police. On the new Unic the oil tank, carried on the forward face of the dashboard, is horizontally divided into two compartments, the lower of which only holds about one and a half pints of oil. A two-way cock on the driver's side of the dashboard, when placed in one position, allows the passage of this quantity of oil into the crankcase. Before another dose of oil can be given, the cock must be carried over to No. 2 position, which allows the lower tank to be filled. While oil is flowing into the crankcase the connection between the upper and lower tank is closed, so that it is impossible at one operation to empty in more than a pint and a half of oil, or under any circumstances to accidentally flood the crankcase. A gauge on the dashboard shows that oil is flowing from the upper to the lower tank.



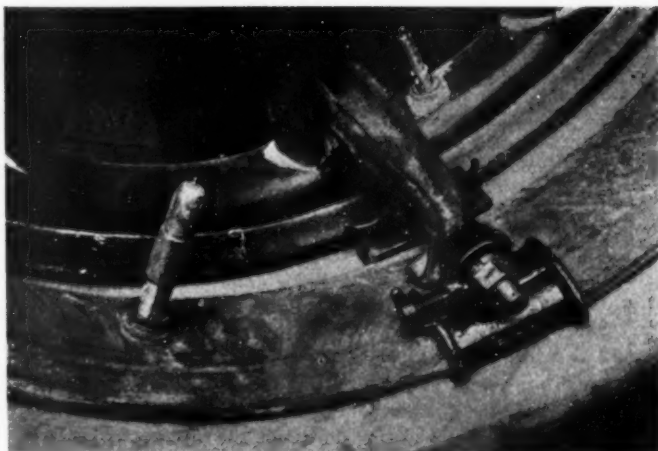
**Single-Cylinder 30-Horsepower Leon Peugeot Racer.**



The only other feature of the engine is the very compact setting of the cylinders, the casting being in one block, without a central bearing for the crankshaft. The valves are exceptionally close, so close indeed that there is but one cap for two, each of the four caps carrying a spark plug and a compression cock. The valves, of course, are all on one side.

#### Claimed to Be Simplest Car.

Charron has made an addition to the small four-cylinder line which at the last Salon was claimed to be the most simple car in the world, by the production of a slightly larger model rated at 16 horsepower. The general design is the same, but a few detail improvements have been made. During the show a reward was offered to any person who could point out a part which could be removed with advantage. Instead of removing parts, the firm has thought fit to make a few additions. Thus the engine, which is in a single casting, with valves down one



New Emergency Wheel Showing Clamp in Position.



De Dion 12-Horsepower Van for Disinfection Purposes.

side, has been provided with a cover for the valves, secured by a couple of thumb screws. As the piping has been reduced to a minimum and the wiring is contained in a single tube, a very clean cut engine is obtained. Formerly the exhaust manifold was cast integral with the engine. This has been abandoned in favor of a separate, single piece manifold, the exhaust pipe connecting up to it at the extreme end. The intake piping, however, is still cast in with the cylinders, there being but one connection from the mixing chamber to the engine.

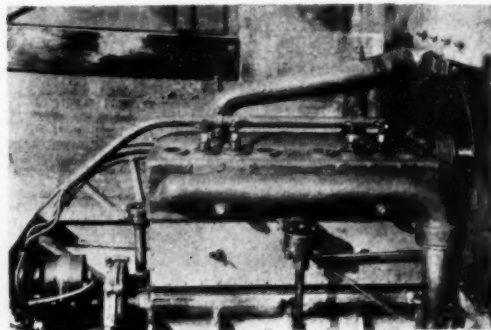
The dashboard radiator with fan in the center, driven by belt off the main shaft, is still retained, but the forward face is closed in a little more than formerly. The portion immediately behind the engine got no advantage from the draught created by running, and could be better cooled by confining the draught set up by the fan. Thus a couple of metal plates have been bolted down the face of the radiator, leaving only those portions which are outside the bonnet, open to the natural current of air; the plates allow the forced draught to be drawn through the other portion with

increased vigor. Ignition has only been modified by the addition of the Bosch self-starter, while the only change to the lubrication is an improved sight feed instead of the single gauge formerly carried on the dash. The steering wheel is carried on the left, with the change speed levers and brake in the center, as the left hand position of the driver is believed to be more suitable for work in crowded traffic.

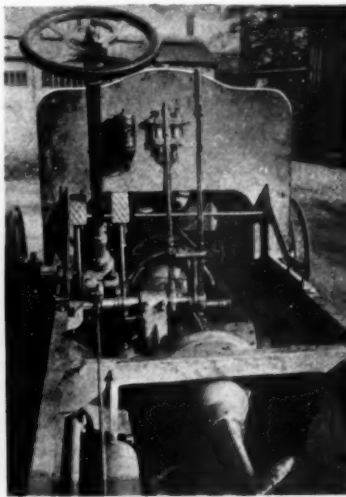
#### Recent Successes in the Commercial Class.

The De Dion Bouton Company, which, by the bye, has recently decided to give over a portion of its works to the manufacture of bicycles, has just produced an interesting type of automobile disinfecting van. The chassis is practically a standard type, propelled by a single cylinder 12-horsepower engine forward under a bonnet. The disinfecting oven, formed of sheet steel, is carried on the special body, being mounted upon runners to allow of easy changes. The linen, etc., to be disinfected is placed directly in the vat and not handled again until disinfection has taken place, for on arrival at headquarters the vat is dismounted and another one put in its place while the first one is undergoing the disinfecting process. The wagon has been adopted for the Sarthe health department.

A new type of emergency wheel having a good deal in common with the Stepney now so extensively employed on taxicabs, has been produced by Engineer Lefevre. The emergency wheel is a plain rim without spokes or attaching lugs. The method of attachment is by means of three or four separate clamps, only connected up to the emergency wheel when this latter is in use. There are two pairs of jaws, the inner one of the first pair of course being fixed and the movable one clamping up on the road wheel rim by means of a threaded bolt. The outer face of the second clamp receives the inner face of the emergency wheel, the jaws being completed by a separate dismountable clamp fitting over the bolt and screwed up by means of a nut. A locking arrangement on the outer clamp makes all secure.



Motor, single casting with valves enclosed.



Dash showing Bosch self-starter.



Rear view of the light Charron car.

Three Views of the New 16-Horsepower Charron Car, with Radiator on Dash, and Steering Wheel at Left.

## Transmission of Power From Engine to Road Wheels

By L.A. Legros  
M.I.M.E.

IN its broader sense, transmission covers the whole of those parts of a car which convey power from the engine to the road wheels. It therefore includes the clutch, gear box and the connection between the gear box and the driving wheels. In some of the early cars in which the axis of the crank-shaft was transverse to the car the power was transmitted to the gear box by a chain or chains. This arrangement was undoubtedly very efficient, but since fashion has decreed that the engine shall be in front, and that its axis shall be longitudinal with the car, this method has ceased to be used.

Under normal circumstances—that is, when the clutch is not being slipped—the driven portion is locked to the driving portion. In consequence of the frame of the car springing, the shaft, which is connected to the driven portion of the clutch, must be capable of deviation from alinement while transmitting the power. Failure to provide for this may result in difficulty with the clutch, and give rise to trouble in gear-changing. An ideal form for the joint between the clutch shaft and clutch consists in giving the end of the shaft the form of a section of a sphere and cutting teeth on the spherical portion. The bearing on the end of the engine shaft, which carries the clutch shaft, should be arranged to permit the spherical portion to move about its center.

In the case of touring cars having a wheel base of 11 feet the frame may become sprung to as great an extent as one-tenth of an inch in the foot over the portions occupied by the engine and gear box. Therefore, it is advisable to make the axis of the engine and gear box meet above the center of the clutch shaft. It is also desirable that means be provided for adjusting the alinement of the gear box, which a three-point suspension facilitates. A number of car builders secure both rigidly to the frame, and the frame can be stiffened vertically by the use of truss bars, but the narrowed frame has little lateral stiffness in the portion which affects this connection. If the frame is straight and deep, or, what is better still, if the main portion of both the engine and the gear box forms one casting, the arrangement may work well, but with the usual proportions of frames and connections rigid fixing of the gear box to the frame may give trouble.

### Connection Between Gear Box and Back Axle or Wheels.—

The transmission from the gear box to the back axle may be divided into the following main classes:

- (1) Central Chain.
- (2) Side Chains.
- (3) Pinions and Internal Gears.
- (4) Propeller Shaft and Bevel Gears.
- (5) Worm Drive.
- (6) Variable Speed Gears. (Not discussed in this paper.)

(1) **Central Chain Drive.**—This is very little used; with it the bending moment on the axle, due to the chain pull when the maximum torque is being transmitted, may be nearly equal to that which would result from applying the whole load at the center; this result would be obtained if the wheels slipped with a torque at the periphery equal to one-third of the load, and if the pitch diameter of the sprocket were one-third of the diameter of the wheels. The pull of the chain tends to bend the axle in a horizontal plane, and the load on the springs bends it in a vertical plane; to obtain the maximum bending moment it is therefore necessary to find the resultant of the bending moments in the two planes.

\*Abstract from paper read before Institution of Automobile Engineers, London, Eng., recently.

(2) **Side Chains.**—In the usual arrangement the differential gear is placed inside the gear box and the projecting shafts are connected to the short overhung shafts carrying the chain wheels by means of Oldham's couplings. These short shafts, as first made, were subjected to heavy and unequal loads; and the bearings, which were plain, wore rapidly, with the result that the shafts tended to get out of true with the differential shafts. When the axes became out of parallel, rapid wear took place in both the couplings and the chains. These difficulties were overcome by dishing the chain wheels.

Owing to the difference in diameter of the chain wheels, the velocity imparted to the road wheels is subjected to variation with the movement of the springs, as much chain being coiled on the driven sprocket as is uncoiled from the driver. If the sprockets are equal, the movement about the axis would be one of translation in a circle; but as the radius of the driver is usually less than that of the driven, the latter tends to be accelerated. The result is that in running on uneven roads or at high speeds when the axle moves considerably relative to the frame, the wheel is subjected to fluctuations of velocity, with attendant variations in the pull on the chain.

(3) **Pinions and Internal Gears on the Driving Wheels.**—This form of drive is very largely used for heavy traction; it is very generally employed on electric vehicles, and has been adopted as the standard for some years on a touring car (Chenard-Walcker). It has certain advantages because the gears are easily protected from damage by stones and dirt, and the ratio of the driven wheel to the driver can be made larger than in the other cases named. It is essential that the axis of the pinion should maintain a constant distance from the axis of the wheel, and the question of change of velocity ratio due to flexure of the springs is dependent on the suspension of the driving shaft or of the motors.

(4) **Propeller Shafts and Bevel Gears.**—There are several forms of this transmission; of these the simplest is the single Hooke's joint. In this form the torque of the back axle is usually carried by means of a tube fixed to the back axle casing; this contains a bearing near the front end of the propeller shaft and another near the bevel pinion; the couple balancing the drive is transferred to the frame through the springs and the joint; as the bearings are usually at least 24 inches apart and both are near the ends of the propeller shaft, the loads carried are not large and amount to 600 pounds as a maximum. This is, however, a considerable addition to the load on the joint, and more particularly on the end faces of the cross pieces.

When the joint is used for transmission at angles less than 5 degrees, the two axes may be placed out of plane, which permits of a more simple but less accurate construction. When the axes of the pins are in the same plane, the ratio of the angular velocities varies from  $\cos \alpha$  to  $1/\cos \alpha$ , where  $\alpha$  is the inclination of the axes of the two shafts to each other. If two Hooke's joints are used in such manner that the intermediate shaft forms equal angles with the first and third shafts, then, for a uniform angular velocity of the first shaft a uniform angular velocity of the third shaft can be obtained.

It is not generally known that the double Hooke's joint can be employed to transmit uniform velocity to a shaft neither parallel to nor meeting the first shaft; the conditions to be fulfilled are:

- (a) That the second or intermediate shaft must be equally inclined to both the first and third shafts, and
- (b) That when the axis of the pin of the first shaft lies in



the plane of the first and intermediate shafts, the axis of the pin of the third shaft must lie in the plane of the third and intermediate shafts. When a single Hooke's joint is used the distance from the center of the pins may vary with movement of springs, or with wear of the radius-rod ends; it is therefore essential that the propeller shaft should be arranged to slide in the portion of the Hooke's joint carried on it.

When two Hooke's joints are used, the casing of the back axle contains both bearings for the third shaft; in this case it is necessary to provide means for preventing the back axle casing from rotating. This may be done either by double radius rods or, frequently, by means of a torque tube fixed to the back axle casing and formed at the forward end as a portion of a sphere carried in a spherical bearing on the frame (Mors) or attached by universal joint which permits of unequal movement of the two back wheels relatively to the frame of the car. (Delaunay-Belleville.) The torque tube must be of sufficient diameter to allow for the movement which the propeller shaft may make relative to it.

**Flexible Shafts.**—In 1903 Weller proposed a form of flexible joint for use between the clutch and gear box in which a star-shaped diaphragm of thin steel was secured to one member at its periphery, and to the other at its center. This was fitted on the Weller car but was not used either for transmitting a considerable horsepower or at an angle of more than 2 degrees, its form limiting it.

**Angular Velocity of Road Wheels.**—(a) With the single Hooke's joint when the back axle moves relatively to the frame it turns with the torque tube about the center of the joint; it is necessary to allow for a motion of rotation of the axle casing relatively to the frame. If the angle through which the torque tube moves is  $\alpha$ , that through which the wheels move is also  $\alpha$ , and consequently the acceleration is as great as it would be in the limiting case of chain transmission. This acceleration is independent of the bevel ratio. Owing to these fluctuations in velocity, the stresses in the pinion teeth are increased where there is large movement of the torque tube owing to badness of the road or to high speed.

When two Hooke's joints are employed the conditions still depend on the movement which the back axle makes relatively to the frame. If radius-rods are used, the conditions are as already given under the heading of chains.

(b) When the back axle casing is fixed directly to the springs its movement relative to the frame under the action of the springs is practically the same as if it were connected by a parallel motion. The loading of the springs is rendered more complex by the addition of the torque necessary to balance the driving effort. In forward running this increases the loading of the front half of the top spring plate and decreases that on the back half. The spring assumes a curve and the acceleration of the road wheels when the axle approaches the frame is negative. This arrangement tends to increase the life of the tires.

(c) When the movement of the back axle is controlled by a parallel motion, the wheels have a movement of translation and there is no acceleration due to the springs.

**(5) Propeller Shaft and Worm Drive.**—This may be arranged either (a) with single joint or (b) with double. The latter is more usual. The same observations regarding the acceleration of the back wheels apply as in the cases of bevel drive and the ratio of the reduction does not affect the question.

**Position of the Worm.**—(a) The worm may be placed below the worm wheel, in which case perfect lubrication is ensured, but it is necessary to take precautions against loss of lubricant through the bearing of the worm shaft. In this system the clearance is reduced; a serious disadvantage.

(b) It is more usual to place the worm above the worm wheel for constructive reasons.

**Driving Back Through the Worm.**—It is necessary that the worm can be driven by the worm wheel when the engine is declutched; this does not depend on the reduction ratio, because a worm and worm wheel can be constructed to drive backward

for any ratio from 00 to 1 and from 1 to 1/00. Given the distance between the two axes the dimensions of the gears can be found when two factors are decided, viz., the reduction ratio, and the inclination of the helix to the tangent on either wheel. It is this tangent which fixes the limits to the design of this transmission; the efficiency of the drive becomes relatively smaller as the angle is increased up to the limit at which driving back is no longer possible. The end-thrust is also dependent on the inclination, and may become very heavy in driving back. Formerly it was extremely difficult to take such thrusts satisfactorily, but the advent of reliable ball-thrust bearings has opened a large field for the use of worm drives.

In conclusion, the author wishes to draw attention to the desirability of obtaining information in detail on the losses which occur in transmission, as follows:

(1) Losses due to friction in ball bearings—(a) under radial load; (b) under axial load.

(2) Losses due to friction of wheel teeth. It is easy to calculate the pressures and speeds of the wheels engaged, and if the data (under 1 (a), above) are known the experiments can be made on an ordinary gear box, and the proper distribution of losses between gears and bearings arrived at.

(3) Losses in the chain, bevel or worm drive. In the case of the chain, it is only necessary to have the data under 1 (a) to enable the loss in the chain to be separated. In the case of bevel or worm drives both axial and radial loads must be calculated, and the losses under 1 (b), as well as 1 (a), allowed for.

(4) Losses in the tire when running under normal conditions; these could be best determined on an electrically driven vehicle both when driven and hauled.

(5) Another point of great importance in carrying out any tests of this class on ordinary petrol cars is the condition of the carbureter. If the carbureter is tuned for running on the road, then it is very improbable that it is performing its function equally well when the car is at rest, because the conditions of vibration (affecting the level of the petrol in the float chamber) and those of the air current through the bonnet (affecting the quantity and temperature of the air drawn in), are not the same as the conditions under which the car was tuned on the road. It would be better to fit up a car with a carefully calibrated electric motor, in place of the petrol engine, and use this for the transmission tests; this method would eliminate a very large possible source of error in the results.

The author hopes that systematic tests on lines similar to those which he has suggested may be carried out in the near future, as these would be of far greater help than any racing records in determining the lines of development by which waste may be avoided.

## NEW BOOK FOR AUTOMOBILISTS.

**The Law of Automobiles.**—The second edition of this standard work, by Xenophon P. Huddy, brings the subject thoroughly up to date. The law has developed to a marked extent, and numerous interesting and important questions have been set at rest. In his preface the author states that the work was written for the judge, lawyer and layman, and that it was his intention to make the book not only valuable as a text-book on the law relating to the subject, but also to make it interesting reading. In both of these purposes he has succeeded admirably. The text-book idea is carried out in the careful arrangement and indexing of the subject matter, and in the specific manner of quoting cases as authority. Due regard for the layman is shown by the full and clear definitions of the legal terms used. Every automobile operator who has ever been caught in the toils of the country constable will be interested in the chapters on "Proof of Speed" and "Defending Speed Cases"; then there are sections on the sale of automobiles, warranties and "seller's talk," liability for defective highways and federal control of automobiling—to mention but a few. The work contains over 300 pages and is bound in law buckram; the publishers are Matthew Bender & Company, Albany, N. Y.

# Letters Interesting and Instructive

## CRACKED WATER JACKET.

Editor THE AUTOMOBILE:

[1.872.]—In looking over my double opposed motor, I noticed a long thin crack in the water jacket, which leaks considerable water. Is there any way in which I can stop the leak, without having it brazed? An answer through "Letters" will oblige, A SUBSCRIBER.

Newark, N. J.

If the crack is very narrow, say not more than 1-16 inch across, it can be fixed without brazing. Get some cast-iron cement, and prepare it for use. When so prepared, it is a thick, dark paste, about like shoe-blackening, but not quite as dark in color. Take a putty knife and fill this into the crack, allow it to stand a little, and try to force in more. If possible, heat the cylinder before applying the cement. This sets just like any other cement, and when hard and dry, is claimed to form an integral part of the casting. The outside can then be filed off smooth, so as to present a good appearance.

Bear in mind that this is only a temporary repair, and will not last long. It would be better for you to get along without the car, now, when the weather is not very favorable, and have the crack brazed, or preferably, welded. In that case, you would have a permanent job and one that would never trouble you again. In the long run this will be the more satisfactory method, as a properly welded cylinder is as good as a new or uncracked one.

## ALL SECTIONS WON'T BUZZ.

Editor THE AUTOMOBILE:

[1.873.]—Will you please advise me relative to ignition trouble which I am having. The source of trouble is that the coil won't buzz, that is, all four sections won't buzz. When the motor is turned over slowly or otherwise, the sections apparently buzz in proper order and correctly, with just one exception. I have gone over all of the wires and they are all right. The timing is correct, or at least satisfactory. The source of current is good; a nearly new storage battery, which gives the desired current. The spark plugs, while not new, are in very good shape, having been cleaned very thoroughly, and that, very recently. Kindly advise me what to do or try, to correct the trouble.

Pittsburgh, Pa.

C. G. VARDIE.

Turn the engine over very slowly and determine the section of the coil which does not buzz. The thing to do then is to remedy the trouble (after finding out what it is) in that particular circuit, which the faulty section presides over.

There are three possible sources of trouble of this kind.

(1) The contact point of the section may be so worn or pitted that it does not respond.

(2) The wire from that section to the timer may be the fault.

(3) There may be an internal fault in that section of the coil.

To remedy (1), take off the contact point and examine it. You can see at once if it

is pitted, or worn. If the former, substitute a new one. If the latter, file it clean and square, using emery or any fine file.

(2) You have apparently cared for already, so this point will not require any further thought.

To correct (3) it will be necessary to have a spare coil so that the parts of it may be substituted for the defective parts of the coil in the car. After you have determined which section does not buzz, remove that section and replace it with a new one. Then try turning the engine over, slowly, once more. If the new section gives out the proper buzz, the trouble is, of course, in the section removed. At your leisure, the section removed may be examined and possibly fixed, so as to be used later in case of similar trouble.

## TO REPAIR WATER JACKETS.

Editor THE AUTOMOBILE:

[1.874.]—Some time ago, the water in the cylinder jackets of my auto froze, making a V-shaped crack seven inches long, and nearly a quarter inch wide. I corresponded with a firm making a specialty of welding such cracks and as they wanted \$30 to repair it, I decided to fix it myself. I bought at the corner drug store five cents' worth of a certain compound, and mixed with it iron filings and water to make a paste. I filled the cracks with this and when it was dry, I began to use the machine. Now after over three weeks' use, it has not leaked nor does the crack show.

The work is easily done, no cylinders to take off and replace, simply make the paste and apply, then let it stand for 30 minutes. If any of your subscribers who have had trouble with similar cracks would like to have the prescription, I will be glad to send it to them. CHARLES HODGE.

East Bethany, N. Y.

This subject is very interesting to many of our readers, as you will see by reading the letter in this issue on the same subject, also the one on welding in last week's issue. Any subscriber desiring this receipt may send to Mr. Hodge for it.

## MORE DRAFT FOR STEAMER.

Editor THE AUTOMOBILE:

[1.875.]—Will you please answer in "Letters" as to how to get more draft on a rebuilt White steamer Model C 1903.

We have good draft running against the wind, but when running with the wind, it blows the fire through the main burner, down. The old draft was side flues, which we took off and made a hole in the cover of the generator or boiler again as large as before and made a down draft. We also lengthened the car and added a new side entrance body. O. L.

Fort Hope, Mich.

Aside from increasing the hole which you made in the generator, to a still larger size, and protecting the main burner by means of a shield, we cannot think of any remedy for your trouble.

Probably it would be advisable for you to apply to the White Company at Cleveland for assistance. Their mechanical department would be glad to advise you of something which would help.

## EFFECT OF JET ELEVATION.

Editor THE AUTOMOBILE:

[1.876.]—Will you please tell me what will be the effect upon the running of the engine of lowering or raising the elevation of the jet in the carbureter. Will it have any marked effect upon the fuel consumption? Scranton, Pa. T. V. H. WILKINSON.

By raising the spray nozzle, you lower the level of the gasoline relatively. Therefore, the liquid will be less sensitive to the suction of the piston, which would tend to reduce the amount of gasoline used. At low speeds, there would be a tendency to starve the engine, which would also be noticeable on hills. At ordinary speeds and under ordinary conditions, the result will be a marked economy in fuel.

Lowering the nozzle, on the other hand, will have the effect of making the level of the fluid relatively higher, and the carbureter will flood at the least provocation. Generally speaking, a richer mixture will be maintained, and as this is harder to burn completely, the economy will be very markedly less than with the raised nozzle.

By trying either one of these for a short time and taking note of your mileage and gasoline consumption, you can easily prove or disprove the above, to your own satisfaction.

## INTEREST IN NAPHTHALENE.

Editor THE AUTOMOBILE:

[1.877.]—I have been greatly interested in the letters that have appeared from time to time in "The Automobile" relative to the use of other fuels than gasoline, and naphthalene in particular. Will you please give me some more information as to how the solid fuel is converted into a gas, and how it is burned? Also, for the benefit of myself and others who might be interested, will you give the numbers of the paper in which the previous articles appeared.

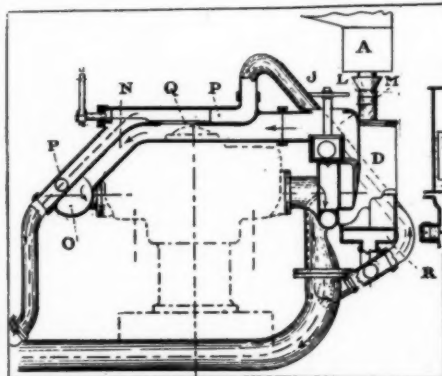
East Orange, N. J.

S. G. WHITING.

There has been so much interest taken in this subject that we are reproducing herewith the form of carbureter used by one maker of French engines, who designed the motor for the specific use of this fuel. The engine in question is the Burlat, an air-cooled rotating cylinder machine. The compression is increased beyond the normal because of the use of this fuel, like alcohol permitting it, or rather showing up to better advantage when it is used. The engine is started on gasoline. Heat from the exhaust is then available. This is used to melt the solid fuel (it comes in the form of pressed bricks, but is powdered before using). After melting, the liquid naphthalene is vaporized the same as any other fuel, and used similarly within the cylinders. In the cut, A is the reservoir for the powdered fuel, B is the supply cock from which the fuel passes through the flexible tube C to the vessel D, where it is melted, and filtered. E is a float, which regulates the entrance of the fuel through



the flexible tube. F is another fuel chamber, fed from D and having another and an independent float G. From the second float chamber, the liquid fuel enters the pipe leading to the engine, through the spray nozzle shown at H. The air enters through pipe I, which surrounds a chamber to which the exhaust has access, the air being preheated in this fashion. After gasification, the fuel passes by the two-way valve J, by the holes L, into the actual carburetion chamber M. On the back of this, another auxiliary air pipe has entrance, and is controlled by means of a valve operated by the suction of the engine at high speeds. N is the piping leading to the inlet branch O. P is a secondary source of heat, being intended to lead exhaust gas for the purpose of heating pipes N and O. Q is the regulator which permits, when desired, the introduction of exhaust gas into the cylinders with the carbureted gas. R is the source of heat used for starting purposes. The throttle shown therein may be so placed as to circulate heated gas around the melting chamber D or to the carburetion chamber M. S, at the right, is the ordinary carbureter for gasoline.



Outline of Napthalene Vaporizer.

The other articles on this subject, appeared in THE AUTOMOBILE, as follows:

March 25 issue, editorial; April 8 issue, letter (1826); April 22 issue, letter (1843).

We take this opportunity to correct a mistake made in the first issue and subsequently repeated in the last. In figuring the cost of napthalene from French into English units, the decimal point was misplaced, and as a result the unit price was given as 12.5 cents. Correctly, this should be 1.26 cents.

Thus, one horsepower per hour requires .5 pounds of napthalene, which at 1.26 cents per pound makes the cost per horsepower-hour come to .63 cents. One horsepower per hour requires .66 pounds of 70 degree gasoline, which in France costs nearly 4 cents per pound. The cost per horsepower-hour with this fuel is 2.64 cents, almost exactly four times as much. In this country, gasoline is so much cheaper and napthalene, so much higher, that this ratio is reduced very materially. But in any case, a large source of economy is opened up by this fuel.

## VALVE POSITION AND POWER.

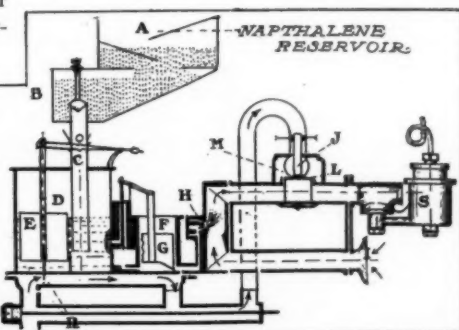
Editor THE AUTOMOBILE:

[1,878.]—Will you please tell me through "Letters Interesting and Instructive" what difference there is in the power of motors with the valves in pockets at the sides of the cylinders and motors with valves in the head, the motors being of the same bore and stroke.

Also, what effect has the stroke on the power of a motor? I notice that most of the horsepower rating formulae do not take it into account. RUSSELL RICHARDSON.  
Brookline, Mass.

It is believed that valves in the head increase the power, although this has never been proven by actual competitive tests. The reason for the overhead location on racing and other high power engines is an entirely different one. The valves are so placed in these cases to allow the reduction of the size of the combustion chamber to a minimum, as this results in a very high compression, which is necessary for high power and high speed. Another reason for placing the valves in this position, in engines not for racing purposes, is the simplified shape of the cylinder casting.

The stroke affects the power of the en-



gine very materially, as was shown in the machines developed in England for the Four Inch race last year. Competitors in this were limited to a bore of four inches, but the stroke was not limited. The result was the development of a lot of engines with an abnormal stroke, in some cases up to nearly twice the bore. That this was a very large factor was shown by the fact that one of these engines actually developed on the test block 57.6-horsepower. The R. A. C., or if you prefer, the A. L. A. M. rating for this bore would be 25.6. The lengthened stroke, then, permitted an increase of 125 per cent over the rating.

Actually, the formula mentioned above does take into account the stroke. It is based upon a piston speed of 1,000 feet per minute. With a short stroke, this would permit very high speed. In the case of a long stroke, on the other hand, the same power would be developed at a lower speed of rotation, but at the same lineal speed.

To take an actual example, say a motor with 4-inch bore and 3 3/4-inch stroke. For the piston to move at the rated speed of 1,000 feet per minute, this shaft will have to rotate at 1,600 R.P.M. If now the stroke be increased to 6 inch, the rotary speed will come down to 1,000 R.P.M. Can you not conceive that a 4 by 6 at 1,000 would develop as much as a 4 by 3 3/4 at 1,600?

## RENOVATION OF UPHOLSTERY.

Editor THE AUTOMOBILE:

[1,879.]—Will you please tell me if there is anything that I can do to revive the looks of the leather upholstery on my car. This has become shabby from use and is rather weather-beaten, so before I begin to use it regularly, I wish to have it fixed up or fix it myself if possible.

Port Huron, Mich. HARLOW DAVIS.

The first step in the treatment of worn leather is to wash it thoroughly with a cloth moistened in ammonia, diluted with warm water. Then wipe as dry as possible with a soft cloth, and allow it to dry out very thoroughly. Next, obtain from some firm of upholsterers what is known as leather or morocco reviver. This should be of the same color as the leather. When the leather is as dry as possible, apply this quickly, a single coat being good; and two better. It not only preserves the appearance of the leather but waterproofs it as well, so that its use is advantageous whether the leather looks bad or not. In case you cannot obtain anything of this sort, the letter (1,880) in this issue relative to coloring tops, will be applicable with the exception that you will not add any coloring matter desired but must confine yourself to adding the color of the leather.

## MORE ABOUT DYEING.

Editor THE AUTOMOBILE:

[1,880.]—I would like to say for the benefit of No. 1,848 in "Letters Interesting and Instructive," from my own experience, linseed oil is one of the most destructive liquids to put on canvas or ropes. If used, it will rot the goods.

I would suggest the use of grated paraffin, warmed up in gasoline, which will later evaporate out, leaving the fibres filled with a good coat. This will surely make a waterproof cover, and can be colored the same as linseed oil, or aniline dyes may be used.

In use, this should be warmed with steam and kept warm until the work is finished, as otherwise it will harden up so that it can not be applied. J. M. BARBER.

North Adams, Mass.

The above remarks from an old salt, who has had a great deal of experience with water and waterproofing materials, should carry conviction with it. The statement as to the destructive action of linseed oil is, however, a startling one, as there is nothing in the chemical composition which should make it attack any fabric, however delicate. The other remarks, made in reply to 1,848, apply with equal force to the use of paraffin, as suggested by Mr. Barber above.

## CRANKSHAFT SIZES.

Editor THE AUTOMOBILE:

[1,881.]—Will you please give me an empirical formula for figuring crankshaft sizes for four-cylinder automobile engines.

Pottstown, N. Y. H. H. NARSELL.

Of all places where an empirical formula should not be used, the crankshaft is far and above the worst imaginable. However, if you wish to have one we can give it to you.

For a five-bearing shaft:

$$\text{the crank pin diameter} = \sqrt[4]{\frac{P^2}{43.4 S}}$$

and for a three-bearing shaft:

$$\text{the crank pin diameter} = \sqrt[4]{\frac{P^2}{37.5 S}}$$

## EX-CHAIRMEN COUZENS AND BRISCOE ARE SOUVENIRED

AS a token of their appreciation of the work accomplished by James Couzens and Benjamin Briscoe as chairmen of the American Motorcar Manufacturers' Association during the past four years, the members present at the Chicago meeting voted that suitable souvenirs shall be given. The presentation took place in New York at a luncheon at the Café des Beaux Arts, May 5.



"Guardian of the Secret."  
Bronze figure presented to Benjamin Briscoe.

Job E. Hedges, counsel of the association, acted as toastmaster, and after a brief résumé of the work of the two chairmen who aided so materially in the association attaining its present position in the industry, presented Mr. Couzens with a watch and charm and Mr. Briscoe with a bronze figure of "The Guardian of the Secret," by Saint Marceaux, a reproduction of the original marble statue in the National Museum of the Luxembourg in Paris. The members of the Show Committee, H. O. Smith, chairman, S. H. Mora and R. M. Owen, for their management of the successful show in Grand Central Palace last January were remembered with suitably engraved watch charms.

James Couzens, who is secretary-treasurer and general manager of the Ford Motor Company, was the first chairman of the association and served for two years, while Benjamin Briscoe served a similar term ending in February. There was a toast to Henry Ford, who was unable to attend the gathering, and general felicitations for the members of the committee of manage-

ment. All those present had something to say regarding the industry in general and the A. M. C. M. A. in particular.

At the luncheon were: H. O. Smith, chairman (Premier Motor Manufacturing Company); C. G. Stoddard (Dayton Motorcar Company); James Couzens (Ford Motor Company); S. H. Mora (Mora Motorcar Company); Walter C. Marmon (Nurdyke & Marmon Company); W. H. Van DerVoort (Moline Automobile Company); G. Vernor Rogers (Mitchell Motorcar Company); A. C. Newby (National Motor Vehicle Company); W. G. Morse (Atlas Motorcar Company); R. E. Olds (Reo Motorcar Company); Benjamin Briscoe (Maxwell-Briscoe Motor Company); Charles E. Duryea, L. M. Bradley and Alfred Reeves, general manager.

At a meeting of the committee of management in the morning there was considerable routine business transacted, together with a discussion of shows and of the trade generally, the reports of which indicated a most prosperous condition with every indication that 1909 would be a banner year in the trade.

The matter of good roads received considerable attention, while that of contests resulted in a resolution being passed in the form of a recommendation to the Manufacturers' Contest Association, to the effect that an effort be made to have the country divided into sections in each of which there should be one leading contest on an unconflicting date to enable the manufacturers to arrange some kind of a circuit that will include the main sections and prominent cities of the country. It was the general opinion that while the manufacturers desire to encourage properly conducted contests by entering cars, such contests should be at dates and in such localities as to permit the maker to participate at a minimum amount of travel. Moreover, it was agreed that through the M. C. A. contests should be encouraged only where there is every assurance of the affair being conducted by experienced men, thereby lessening the chance of controversies as to rules and management. These always lead to dissatisfaction, so the move is a good one.

### EARLY DEATH OF PERCY MEGARGEL.

Percy F. Megargel, of New York, famed as a pioneer in American transcontinental touring, died of cancer May 2 after a month's illness. He was thirty-four years old and is survived by his widow and infant daughter. Interment was at his boyhood home in Scranton, Pa.

Among Mr. Megargel's strenuous accomplishments in motor-ing, his double transcontinental trip, made in the *Reo Mountaineer* in the Fall and Winter of 1905-6, has never been equaled in the variety and serious character of obstacles overcome. He was a pioneer in touring almost inaccessible parts of the West.

Leaving New York August 19, 1905, accompanied by David F. Fassett, he drove his car, equipped as a traveling camp, across the northern part of the continent to Portland, Ore., over the roughest and muddiest roads ever traversed by a car. From thence, in midwinter, he went to San Francisco, through Los Angeles, crossed the snowbound regions of the Rocky Mountains in Arizona and New Mexico, with mercury frequently 40 degrees below zero.

He and Fassett were lost for days in the snows of the Rockies and in the sands of the desert, and once saw their car disappear in the quicksands of a river. Three weeks later, melting snows sent down a flood and washed out the quicksand and revealed the machine. With but a few adjustments and tuning up of the little car the intrepid autoists soon had it in smooth-running order again and resumed their journey. No other motorist has thus crossed the continent from coast to coast and back again in a single car absolutely under its own power. Mr. Megargel had recently written a charming book, "The Car and the Lady," covering some of his experiences in strenuous automobil-ing.

### DATES OF ATLANTA SHOW ANNOUNCED.

NEW YORK, May 10.—Atlanta will have the Southern National Automobile show from November 6 to 13, opening and closing on Saturdays. This was decided upon at the regular monthly meeting of the executive committee of the National Association of Automobile Manufacturers, held in this city last week. Another date had previously been suggested, but a change was deemed advisable. To consider this matter and those of good roads work and pending automobile legislation at Albany, the following members of the committee attended:

S. D. Waldon, Packard, who presided; Benjamin Briscoe, Maxwell; Charles Clifton, Pierce; L. H. Kittredge, Peerless; S. T. Davis, Jr., Locomobile; H. O. Smith, Premier; Albert L. Pope, Pope-Hartford; R. D. Chapin, Chalmers-Detroit; W. R. Innis, Studebaker; William E. Metzger, E-M-F; C. C. Hildebrand, Stevens-Duryea; G. W. Bennett, White, and S. A. Miles, general manager.

### TIRE AND RIM COMPETITION IN TOUR.

NEW YORK, May 10.—In conjunction with the three-day tour of the New York Automobile Trade Association to the Catskill Mountains and the Berkshire Hills there will be a competition for tires and demountable rims. The run takes place on June 12, 13 and 14, and all leading tire and rim makers will be invited to participate in the tire side of the contest. Each concern will be allowed to have observers, who will report upon the condition of the tires, especially as to punctures and blow-outs. This will be the first time that such an innovation has been introduced into an endurance run in this country, and will include all the trials given to tires in general touring.



BALL BEARINGS

ORIGIN, MANUFACTURE, DESIGN AND APPLICATION

BY E. SACHS

AFTER considerable search I have been able to ascertain that a certain iron founder named Vaughn, of Carmarthen, England, took out in 1794 the first English patent on ball bearings. The construction foreshadows in principle our own ball bearings of to-day. Early in the twentieth year of the last cen-

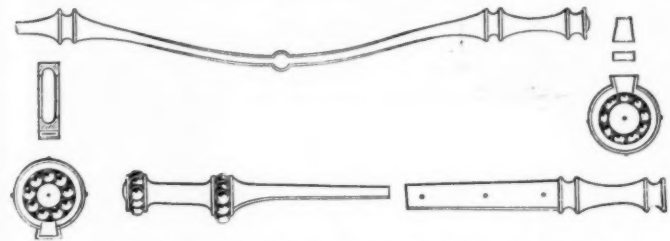


Fig. 1—Diagram of the earliest ball-bearing patent.

tury these bearings were used in mine wagons, but as the parts were made of soft materials their life was not great (Fig. 1). In the year 1853 an American announced a ball bearing which he proposed to use in railway cars. The construction of this bearing is somewhat extraordinary, as the inventor was of the

new vehicle. At first they had to import all their ball bearings from England, but before long they made the bearings in Germany and imported only the balls, which at that time were very expensive. For the same money which one pays to-day for a gross, one could then purchase only three or four balls. In 1880 two Germans, Fischer, of Schweinfurt, and Duerkopp, of Bielefeld, formed a partnership with the object of making balls. Working in conjunction with his then foreman, to-day director, Hoepflinger, Fischer constructed a shot machine, as he called it, permitting substantially perfect balls to be made in quantities. After roughing out, the balls were heated in retorts or in crucibles of molten salt, and were hardened in water or oil, after which they were ground in a similar machine with a mixture of emery and oil. They were then polished in tumbling barrels, and finally underwent the crucial test of being calipered to the one-hundredth of a millimeter for roundness and equality, and sorted by sizes. These balls soon made a reputation for themselves all over the world, and the business grew so rapidly that in a few years a larger ball-bearing factory was started in Schweinfurt under the name of Fries & Hoepflinger, so it came about that Schweinfurt was the source of the German ball-bearing industries. To-day the Schweinfurt factories employ 3,500 hands.

Diameter of Balls in English Inches	Diameter of Balls in Millimeters	Breaking Load, Kilos	Permanent Set, Kilos	PERMISSIBLE LOAD ON ONE BALL IN KILOGRAMS AT THE R.P.M. NAMED							
				10		500		1000		1500	
				P 1	P 2	P 1	P 2	P 1	P 2	P 1	P 2
1/4	6.35	2,016	282	56	22.4	21	8.4	17	6.8	15	6
1/2	12.7	8,060	1,129	224	89.6	83	33.2	69	28	56	22.4
3/4	19.05	18,050	2,527	504	202	187	74.8	155	62	130	52
1	25.4	32,260	4,193	896	358	333	133	275	110	230	92
1 1/4	38.1	72,580	7,260	2,016	802	749	300	619	248	518	207
2	50.8	100,645	12,903	3,584	1,433	1,331	532	1,101	440	920	368
2 1/2	63.5	125,500	20,161	5,600	2,240	2,080	832	1,720	688	1,440	576
3	76.99	174,190	29,030	8,064	3,225	2,995	1,198	2,477	991	2,074	830

P 1: When the ball runs in a groove.

P 2: When the ball does not run in a groove.

opinion that the balls would get out of line from wear, and to avoid this he proposed using an outer ring of rubber and steel spokes with the intervening spaces filled, also with rubber, to which the bearing automatically adjusted itself. (See Fig. 2.) Early in 1860 we find several new forms of ball bearings in America, among others a patent on ball bearings for a marine propeller. This bearing shows a marked advance and comprises in combination a thrust and several radial bearings. (See Fig. 3.) In 1867 we see the first application of ball bearings in the "bone shakers" of that time, of which the modern safety bicycle is the successor. It was in this year that a certain Frenchman, named Michaux, on one of these same bone shakers won the race from Paris to Rouen. This bone shaker was equipped with ball bearings. In 1878 we find the first German patent issued to a certain George Weikum, of Budapest. (See Fig. 4.) In this bearing the balls appeared to run separately, as is shown in the drawing, showing the application of the bearing to a railway car. In the same year, 1878, an Englishman by the name of Thomas Humber introduced ball bearings in the connecting rod of the high-wheel bicycles then made by him. (Fig. 5.) In this year we find also a broad German patent on a good form of ball bearing issued to W. Bown, of Berlin. In consequence of these improvements, the high wheel soon found its way in large numbers to the German market, and before long German manufacturers undertook the construction of the

The above table shows the relation between size and load-carrying capacity at 10, 500, 1,000 and 1,500 turns per minute.

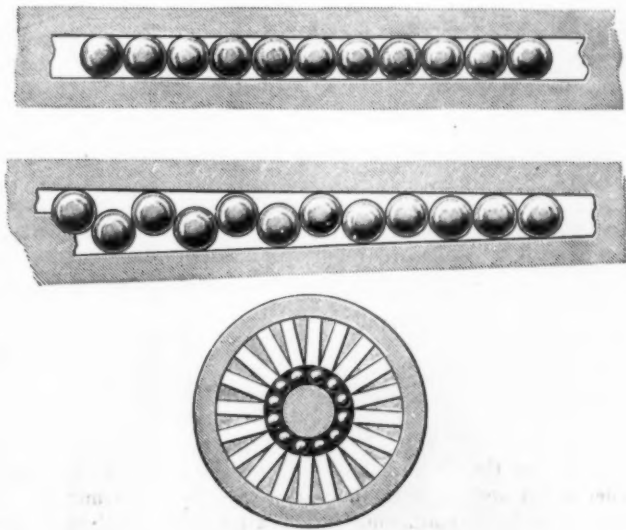


Fig. 2—An early American idea. The outer race is formed of the inner ends of steel spokes, whose outer ends are cushioned against a rubber ring. The second sketch shows how the inventor thought the balls would crowd each other out of line unless the outer race was made elastic.

An address before the Polytechnische Verein, by E. Sachs, of Fichtel & Sachs, Schweinfurt, Germany.

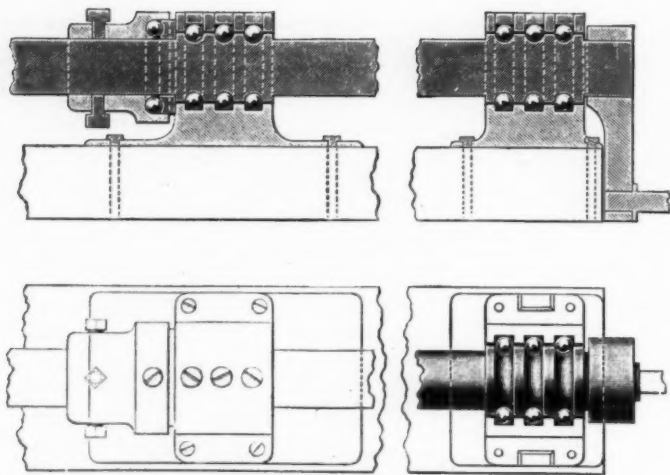


Fig. 3—An early American propeller shaft bearing.

At first the bicycle industry was the only market for these balls. The more extended application of the ball bearings advanced very slowly, although many attempts were made to demonstrate their utility in widely diversified industries. This may have been partly because the technical schools at this time gave little or no instruction on ball bearings, and the subject generally was regarded as an untested novelty whose practical usefulness could be demonstrated only by long experience.

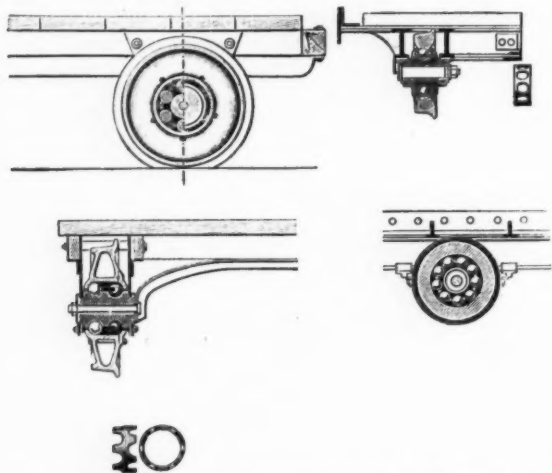


Fig. 4—The Welkum ball bearing applied to street cars.

We, ourselves, in 1895 used in our transmissions ball bearings of forged steel, which were carefully hardened by baking in bone-dust. However, these bearings in a few years had to be replaced, because, in the first place, the materials were unsuitable, and, secondly, because the balls were too small. In 1898 my firm received a contract from the city fire department of Leipzig to furnish ball bearings for the heavy service trucks weighing up to four tons. These bearings were tested for a year and stood up splendidly, so that in the same year all the trucks, fire engines, ladder trucks, etc., of this fire department were equipped with ball bearings. After this it was proved that a good axle could be

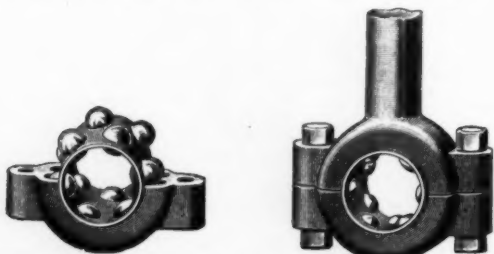


Fig. 5—Humber's crank pin bearing, used on bicycles.

fitted with ball bearings and sold under guaranty. At the Nuremberg Exposition of 1900 we find a variety of ball bearings.

Present types of ball bearings may be divided into three classes, of which the first is the adjustable cone bearing. (Fig. 6.) This bearing has stood the test excellently under small loads and in moderate service, and is used to-day in millions of bicycles. Under larger loads it has been found inadequate, and the earlier constructions with more than two rows of balls have not always worked out well in practice, especially when the construction itself has been faulty, as indicated in Fig. 7.

A ball can roll freely only with two opposite points in contact. Every third and fourth point of contact involves more or less of a spinning or sliding movement of the ball, which shortens

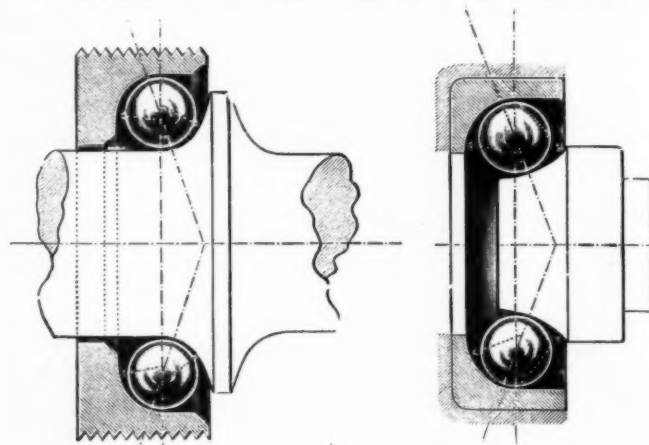


Fig. 6—Correct design of cup and cone bearing.

the life of the bearing and must operate to the detriment of the contact surfaces, especially with heavy loads.

The second class of bearings comprises all those sustaining end thrusts (Fig. 9). In this bearing care must be taken that the points of contact of the balls are exactly opposite, and that the grooves in which the balls run are formed to a sectional radius a little larger than that of the ball, thus securing safe and easy movement of the balls. These ball grooves must be so designed that not only may smooth rolling contact be secured, but some measurable area of the ball surface make contact with the race. It is also possible for a thrust bearing to act at the same

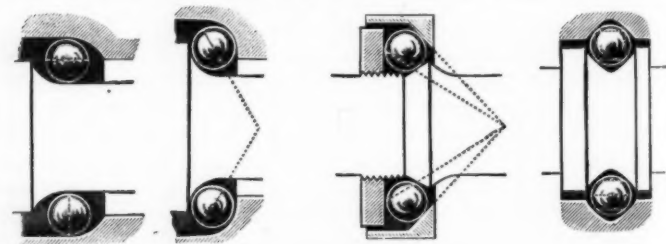


Fig. 7—Faulty designs of 2, 3 and 4 point bearings.

time as a radial bearing. In this case, however, the four-point system must be used. (See Fig. 10.)

In designing thrust bearings it is to be noted that all the balls contained in the bearing are constantly under pressure. The following table of thrust bearings shows some suitable loads for equal shaft diameters and revolutions with different sizes and number of balls:

Shaft Diameter, Mm.	Allowable Load	R.P.M.	Number of Balls	Ball Diameter in Inches
65	550	500	22	3/8
65	1,000	500	15	5/8
65	1,200	500	14	11/16
65	1,300	500	13	3/4
65	1,600	500	12	7/8
65	1,800	500	10	1



As a third class of bearings comes the so-called annular bearing, Fig. 11. It is intended for all classes of radial loads. This type of bearing also has in recent years been improved through many patents, and it may be called the most modern and perfect of the ball bearings. It consists of only three elements, namely, the two races and the balls, and when these three are assembled the bearing is perfectly self-contained.

The new annular bearing requires no adjustment or fitting and the rolling action of the balls takes place without interference or friction. A further advantage lies in the fact that as high as 96 per cent. of the space between the races can be filled with balls. The balls are introduced through filling slots whose size is a little less than the diameter of the balls to be introduced, so that the balls are forced between the two races under pressure, and, in fact, by virtue of the elasticity of the materials. The slots are inclined at an angle to the races, thus achieving greater security.

So far as the literature of patents indicates, the use of filling slots for introducing balls between the two annular rings originated with an American, Kouns, who employed this construction in his wind-mills.

In contrast to the thrust bearing, in which all the contained balls are constantly under load, in the annular bearing only about 30 per cent. of the balls are under load at one time, and this must be taken into calculation.

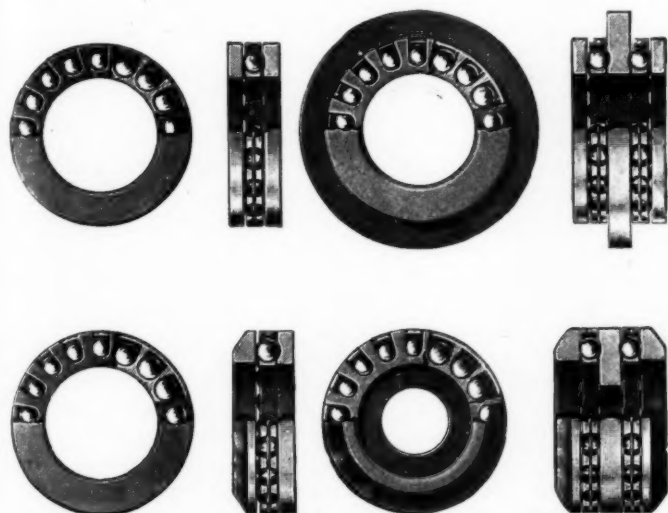


Fig. 9—Showing some varied types of thrust bearings.

It is also possible for equal axle sizes and speeds to use different dimensions and loadings according to the size of the balls themselves. The following table makes this clear:

Shaft Diameter Mm.	Permissible Load on the Bearing	R.P.M.	Number of Balls	Diameter of Balls, English Inches
80	1,000	500	20	1/2
80	1,300	500	21	9/16
80	2,500	500	12	1
80	3,000	500	14	1 1/16
80	4,500	500	11	1 7/16

These bearings are also made with two rows of balls, and this construction is adapted to the carrying of moderate axle loads. A further advantage of this bearing is the fact that the balls are separated, and the injurious friction of the balls upon each other is avoided.

I have myself used large ball bearings without separators for several years in a machine transmitting 300 horsepower through gearing. It resulted, in this case, after a few years, that the friction of the balls against each other resulted in wearing grooves in them. This is the clearest evidence how necessary it is for a practical ball bearing that every ball be isolated, otherwise the rubbing of the balls together ruins the bearing.

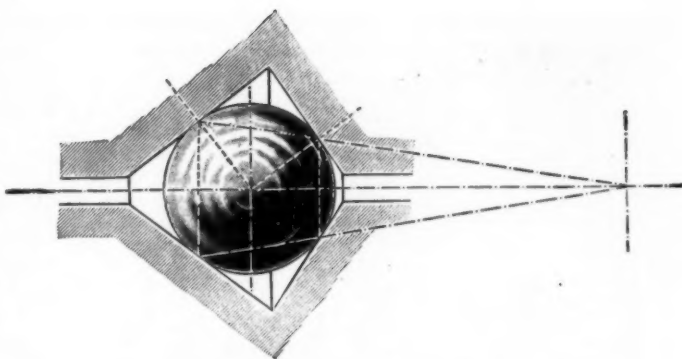


Fig. 10—Four-point bearing for combined thrust and radial load.

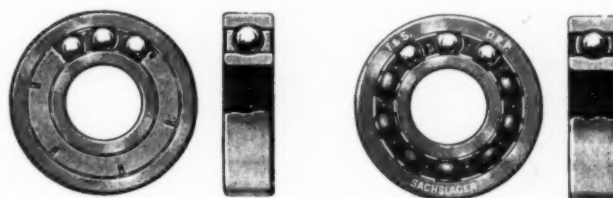


Fig. 11—Plan and section, modern annular ball bearings.

A great many forms of separators and spacers, otherwise called ball cages, have been devised for separating the balls. Fig. 11 shows a construction used by my firm.

If, in the application of this bearing, it is necessary to sustain heavy axle loads, it is absolutely necessary to add an independent thrust bearing or to employ a so-called combination bearing which takes care of both thrust and radial loads. (See Fig. 13.)

To-day ball bearings are used in practically every branch of industry. They have been employed with fine results in power transmission, machine tools of all sorts, agricultural machinery, propeller shafts, gun turrets, dynamos, artillery mounts and lighthouses. I have endeavored to show that they have been so far perfected that a progressive engineer and constructor can hardly build a machine in which ball bearings may not be used at one point or another.

Indeed, why should it not be thus? Every-day manufacturing costs in coal and labor are increasing. By the use of ball bearings the means is at hand to reduce costs 25 to 30 per cent., an economy which every manufacturer will know how to appreciate. It seems certain that before long no wheeled vehicle, be it automobile, trolley, railway car, or traction machine, will be built without ball bearings. Even those most modern inventions, the airships, are provided with ball bearings at all wearing parts, and I believe, gentlemen, that I may claim with safety that the manufacturing economy which we are all striving for is primarily to be sought and found through the adoption of ball bearings.

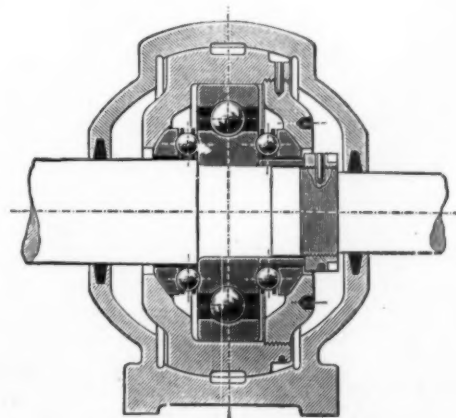
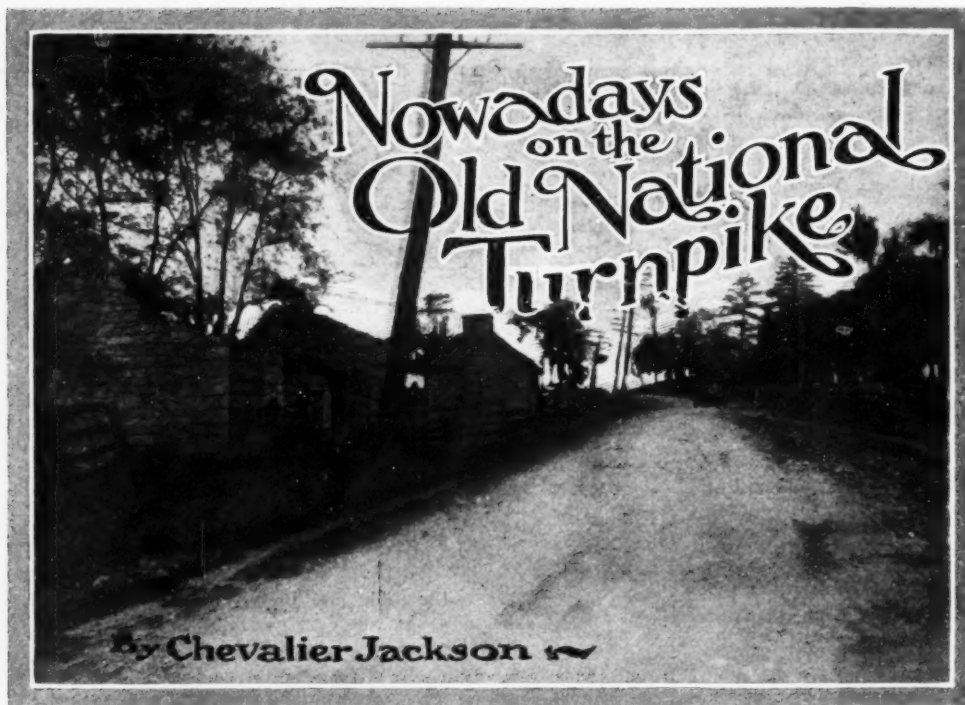


Fig. 13—Cross-section combination radial and double thrust bearing, with means for locking.



Abandoned Smithy Where Horses Were Shod Before the Days of Autos.

SITTING on a giant boulder at a point where the "old pike" crosses the line of the long-abandoned Braddock's Road, we meditated on the many scenes of our country's history which have been enacted here. First came the deer and buffalo, wearing paths along the ridges which were first swept free of snow, and avoiding the marshy valleys. Then the restless nomadic Indian, ever shifting his wigwam, stealing silently along on the watch for a hostile brave. Then the trapper, no less wary, in his buckskin hunting shirt and breeches, with his flintlock rifle in his hand, going out to set his line of traps, or returning with his bundle of pelts. Then came Nemacolin, the Indian guide, blazing a path for the packhorses of the traders and settlers. For years the sturdy little horses carried their pack saddles, laden with salt and merchandise, westward over this rugged path, returning piled high with pelts of the deer, bear, otter, mink and beaver.

Washington, with his little band of backwoodsmen, toiled through these forests bound for the head of the Ohio River, with his message of inquiry for the encroaching French.

Next came the red-coated English soldier, Braddock, preceded by his engineers and sappers cutting a roadway, and followed by horses dragging wagons and cannon. The sound of the slowly-moving army had not long died away when back came the sorrowful handful of men carrying their dead commander. Silently, in the night, they buried him in the middle of this roadway.

Then appeared the government engineers, disdaining the devious path of Nemacolin, which kept to the ridges for the lookout. Up hill and down dale they went, straight as an arrow, save where too steep a grade happened in the way. Then the road-makers, cutting a 60-foot swath through the forest. Along came droves of cattle, sheep and hogs, slowly-moving six-horse teams, some with bells on the hames. Past these hurried the passenger coach, with its body hung like a sailor's hammock on leathern springs; faster yet the springless fast stage coach, its mail boot behind the driver, and back of this a few passengers holding on for dear life as the four foaming horses galloped the ten miles to the next relay. Past these fast coaches flew the express messenger, his leather mail-bags behind his saddle, his horse never slower than a gallop, no matter how steep the hill.

Then the throng grew less and soon only an occasional farm wagon came along, rattling on the stones of the old roadway.

to a high state of perfection. Then Pittsburgh was a mail and commercial distributing point; old mail contracts required two daily trips, timed from Baltimore to Pittsburgh in two days five hours over the Pittsburgh, Philadelphia and Baltimore turnpike. By this road it was only 294 miles to Philadelphia, whereas by the present railroad it is 354; so the directness of the old pike, laid out up hill and down dale, is seen in contrast with railroad engineering, which usually follows watercourses.

In those days steam rollers and crushers were unknown. The limestone was broken by hand with an iron hammer, and had to be small enough to pass through a two-inch ring; this was then spread on the road. To compel traffic to drive over it logs were laid crosswise at the sides of the newly stoned portions. Notwithstanding this apparent crudeness the results were good. Then the railroads came, and roadmaking rapidly became a lost art. The old highways were abandoned to the weather and allowed to wash away to their foundations. In places hollows were filled in with boulders larger than a man's head; waterbreaks were added from time to time, and mud was thrown on from the ditches.

Yet, with all its faults, for pleasure travel give us the old turnpike. We do not care for cross-country roads that harass you with the constant expectation of ending up in some private lane. The old pike, neglected and rocky as it is, nevertheless has a bottom in the worst weather; no need to lie awake nights thinking of how next day you are going to plow through the mud with the chains on. Moreover, the pike crosses the State between the two railroad trunk lines, and is free from their sickening, blackening pall of soft coal smoke. Where the road approaches the railway, with its border of advertising signs, coke ovens, mills and factories, with their attendant squalor and desolation, the nature-lover speeds up and hurries on.

Leaving Pittsburgh, we take our chances over a dangerous grade crossing, and, passing through Wilkensburg, climb the hill on the old Pittsburgh, Philadelphia and Baltimore

What's this? A whirring flutter, a glitter of gleaming brass; a gay crowd, hatless men with wind-tossed hair and women with hats tied down with veils, rushes swiftly up the mountain road, and is gone over the crest. Soon will that old rock on Laurel Ridge see the pike smoother, busier and gayer than ever, its youth renewed by the automobile.

#### Pittsburgh's Roads Rough.

We of the Pittsburgh district, to get into more civilized communities where they have better roads than has Southwestern Pennsylvania, have to do penance in traveling over some of the roughest, muddiest highways existing in any locality of equal wealth the world over. Machine and tires are never at their best after the good roads of the more favored districts are reached, because of the abuse incidental to getting over the highways with which we are hemmed in.

Sixty years ago roadmaking in Western Pennsylvania was carried



Old Tavern on Laurel Ridge.



turnpike, here known as the Greensburg pike. On the way we find a tract of farming country left like an island between smoky, grimy Pittsburgh and its smokier, grimmer suburbs, Turtle Creek, and Wilmerding. At Greensburg we take a clay road south to Mount Pleasant; thence east to Somerset over a good toll road is a beautiful ride across Chestnut Ridge and Laurel Ridge. Groves of oak and chestnut trees border the road. Now and then we stop to drink at a spring of cold water, and spend an hour wandering through the woods gathering "mountain tea" and laurel and rhododendron blooms.

On one of these stops, while we were enjoying ourselves, seated on a mossy bank hidden by bushes, four different parties in high-powered machines whizzed by, the occupants smiling at what they supposed was our broken down and abandoned car by the roadside. To these gentry there could be no earthly reason, other than a breakdown, why anyone should stop in these mountains. What cared they for a little luncheon in a secluded moss-carpeted spot surrounded by ferns, laurels and rhododendrons, with a lichen-covered rock for a table? For were they not going to Bedford in less time than anyone had ever gone to Bedford before? "The motor never stopped from Pittsburgh to Bedford." That is the ambition of these poor misguided mortals who mistake the means for the end.

There are some things, however, to be said in excuse for the rabid legislator. The speed and schedule fiend and road-hog is just numerous enough to bring us all under the ban. If the thoughtfulness and consideration for others that characterizes good breeding prevailed, there would be no need for any law. One hired chauffeur derided us for taking three days to reach Cumberland. He had come the same distance in one day. He had used up four outer casings, had broken two springs, and had caused three runaways. Such a man should be forbidden to run a machine, and law-abiding autoists should see that he and his like are barred out.

#### Touring Through the Shenandoah Valley.

From Cumberland we wended our way eastward over the National Road to Hagerstown. Our penance was over. We were in a community where good roads abound. From Hagerstown the Shenandoah Valley pike enticed us, and for a week we explored its historic highways and byways.

This is the most beautiful country that God's sun ever shone upon. And yet these people regret the collapse of a commercial boom started a number of years ago, which was to have brought manufactories into this garden—I had almost said Eden. We who had escaped Pittsburgh's grime and soot and smoky gloom



Giant Boulder Where the "Old Pike" Crosses Braddock's Road, Where England's Stubborn General Was Killed.

After leaving Somerset no toll is paid and the road deteriorates. In places the roadbed is a mass of large, loose rocks, somewhat rounded by traffic and the weather. Nearly every signboard tells you the distance to Shanksville—a gentle reminder that you may need his mare to reach his ville.

#### Good Farms and Improved Roads Go Together.

In Bedford county beautiful farms are seen, and the road improves; strange, is it not, that good roads and good farms always go together? Few legislators seem to realize that fact.

South of Bedford, on the way to Cumberland, we were delayed over an hour by a fractious horse left unattended by the roadside. Only one of our party was able to operate our machine, and by ill luck this same person was the only one capable of holding a horse. Even if one of our party could have held the horse it would have been illegal, and had damage resulted the owner of the horse could have recovered the loss. The Maryland law expressly provides that when a horse standing unattended, whether hitched or unhitched, shows signs of being frightened, the autoist must wait until the owner or driver—none other—can get hold of and control the horse. Suppose the owner is a doctor, indoors, busy with a critical case? Or suppose he is on jury duty, or in some far-off corner of the town, drunk? The autoist must take the risk of illegally holding the horse, or getting someone else to hold him, or camp out by the roadside indefinitely. It has always been contributory negligence, in some States a misdemeanor, to leave a horse stand unattended and unhitched; but as against the autoist the horse owner can be as negligent as he pleases.

to revel in this fragrant sunshine, redolent of new-mown hay, could not understand how these people could regret the failure of a commercial invasion which would have brought smoke, dirt, disease and an illiterate horde to fill their streets with drunkenness and their jails with prisoners. Truly, man's universal trait is discontent.

This is a great stockbreeding country. Horses of good road qualities have been bred here for over a century. Children literally grow up with reins in their hands. Women and even little children usually drive well, and, instead of seeing a driver pulling on the reins and yelling "Whoa!" until the horse stops, rears up and leaps over sideways and backward, you will see them, whip in hand, touching up the animal lightly or severely, as needs be, to keep him going. No living man can guide a horse that is not going ahead, any more than one can steer a boat with no "way on." You can stop the horse afterward, but keep him going when passing you must. One incident in Pennsylvania indicated autophobia. On a hilltop half a mile ahead we saw a man get out and hold his horse. When we reached him we found the horse was stone blind! As he never even pricked up his ears, he must have been deaf also.

We always thought we knew all about horses, but one point we learned from an old horseman was the quieting effect of a voice from the machine. A loud "Whoa, boy!" several times repeated will quiet a hitched horse that is not already too badly frightened. A "Steady, there!" to a horse being driven seems to tell him that the thing is at least partially human. It is a real terror to the horse, as is often shown by the animal's trembling. All that is necessary is to convince him that it is not dangerous.



Near to Nature's Heart on Glade Road, at Laurelville, Pa., Famous for Arcadian Beauty.

We met a great many Southern people socially, and they are delightful. On the road they are very courteous and kindly disposed. They do not seem to fear the inroads the automobile will make on the horse-breeding industry. Then, too, they have not yet encountered the road-hog. They will only too soon, however, for this is certain to be a favorite touring route. When the speed and schedule fiend invades, courtesy begins to wane. We always stopped our machine, and, if things looked desperate, our motor also. To our oft-repeated "Sorry to trouble you," we invariably got a smile and a response to the effect that they were glad of a chance for their horse to get used to it.

#### Virginia Climate, Sports, and Roads.

Virginia sunshine is doubtless beneficial, but, as at the seashore, you do not feel warm and do not realize how you are getting burned. At least seven layers of epidermis have exfoliated from our noses. Yet it is cooler here in the shade than it is in Philadelphia or New York. It never seems to be humid, and once under shelter, natural or artificial, you feel a cool breeze. We are reserving this philosophical observation for a breakdown—it will be cooler under the machine than in it. When the machine is going, however, the air is always cool and delightful in the hottest sunshine. Whether malaria exists or not, we were unable to ascertain, but we suspect that it does in some localities. The children are pale; they are never allowed to play in the sunshine, but are kept indoors till evening. The brown skins of our Northern children cannot be seen here.

Turkey buzzards are plentiful. They are homely birds close at hand, and especially disgusting when feeding, but seen at a distance soaring near one of the hills of the Blue Ridge, they are as graceful as any eagle. The skunk is an animal over which we cannot enthuse; he has no redeeming qualities whatever. The cotton-tail is also abundant here. Quail shooting is said to be good, and an autumn shooting trip would be delightful. Bass fishing, too, is evidently good, as we saw many fine strings.

Roadmaking in the Shenandoah Valley is systematically done. About 25 miles are newly made each year, and the older sections are repaired constantly by fresh additions of finely crushed limestone. We saw but one steam roller, and in most sections the repairs seem to be rolled in by the traffic—a little hard on rubber tires. When the roads in Virginia get washed the whole road is scraped to a new crown. As this loosens up the surface of the old foundation, it scarcely seems advisable. Of course, a crown must be maintained, but it would seem possible with the aid of a steam roller to do this by filling the hollows with screenings. When one of these newly-scraped sections is encountered it makes a man count how many spare tires he has strapped to his machine. Fortunately, only a short distance is done at a time.

One great difference between these Valley pikes and the National road is the few bridges of the former, and their flimsy

character. Many are of questionable safety for heavy machines. Most streams are forded. On the National road, however, the bridges are massive stone arches, one or many, as required. In many instances the stream is so small as to be invisible in the grass, yet it is crossed by a stone arch guarded properly.

It behooves the traveler in Virginia to look well to his water-proofs, as the rains are almost tropical in their downpour. Tops should always be in order and well-fitted side curtains in readiness. It is always cool under a top, even on the hottest July day, and no one need hesitate to take this tour in summer if he carry one. Personally, we prefer to take the weather as it comes, and we leave the top at home for city use.

Staunton is a very old town. During the Revolution its citizens defied Tarleton, who had chased the Legislative Assembly from Richmond and Charlottesville in turn, and protected it until it had finished its session. Having "done" the valleys, and having been made painfully aware of the rustiness of our historical knowledge, which we brushed up on the way, we took the Northwestern turnpike to Romney, W. Va., where we turned northward to Cumberland. Once again on the "Old Pike," we headed across the mountains, homeward bound.

#### Homeward Bound Through the Mountains.

Weyer's cave, near Burkettown, about nine miles south of Harrisburg, is well worth a visit. It was considered a great wonder before the Luray cavern was known. It was discovered by a trapper, while trying to dig out a groundhog which had carried a trap through a hole in the earthen wall which closed its mouth.

As we picked our way westward over rough and rocky slopes we noticed a number of shoe soles lying in the roadway, which we steered clear of, as of boards, for fear of nails. Afterwards we discovered that the soles are used as break liners on the wagons, and, owing to the long grades, they are soon torn off and lie in the road. The mountains are hard on brake shoes, as well as tire shoes. Our own brake liners of brass were worn through, and the steel bands and cast drums were fast grinding away. The waterbars are a great menace to springs, and even with the best suspensions the twisting strains are very great, and water and gasoline connections are prone to leak.

Once more Pittsburg was drawing near, and its pall of smoke was almost visible on the horizon. Mills and factories lined our way, and we said good-bye to the valleys of Virginia and the "Old Pike."

The first automobile stage sent from Rock Springs, Wyo., to Verriah, Utah, caused the death of a horse from fright. The horse met the automobile on the highway, gave a neigh of fear and fell dead. Heart disease is supposed to be the cause. The horse was 36 years old and valued very highly by the owner.



## MAINE GIVES EVIDENCE OF AUTO ACTIVITY

By LESTER M. HART.

PORTLAND, ME., May 8.—Never before in the history of the State of Maine have so many automobiles been assembled as were present at the Union Station on the occasion of the visit of the Boston Merchants' Association. They were met by about sixty automobiles, and were then taken on a trip which covered a route of 14 miles. The visitors from the "Hub" were surprised when they were told that all the cars were privately owned. It was an extremely good thing for the city, too, this display of the up-to-dateness of the place, and it showed conclusively how the automobile has taken on in Maine. In the course of the trip other autos were seen, so that the visitors were well informed that the supply had not been exhausted in providing for their comfort. A conservative estimate of the value of the cars in the parade was placed at \$150,000, an amount never equaled even at the automobile shows in the State, and all classes were represented in the line-up.

The pilot car for the parade was a 1909 Ford, with A. M. Spear, Jr., driving, and the members of the committee, Postmaster Fred. H. King, Maurice C. Rich, secretary of the Board of Trade, and Frank M. Low, were also in the car. This machine was followed by the handsome Stevens intermediate containing Mayor Adam P. Leighton, of Portland, and his party. To the credit of the cars, be it said, there was not one of them that had to give up its place in the parade, and all of them covered the 14 miles of the route, up and down bad hills, without a mishap.

The automobile business in Maine is booming as it has never boomed before. Judging from the way applications for registration of cars and licenses for operators are pouring into the office of the Secretary of the State, there will be the biggest business among the trade in Maine this year in the history of the industry. Not since the automobile registration law was enacted in 1905 have there been so many applications. The amount for the first quarter of the year is about double the number registered during the same period of 1908.

The total amount which has been paid into the State treasury in fees since the law became effective in June,

1905, is \$16,950, divided as follows: Registration of automobiles, \$7,038; licenses to operators, \$8,216; registration of motorcycles, \$726; licenses to dealers, \$970. The total amount paid into the treasury during the past four months of the current year is \$1,418, divided as follows: Registration of automobiles, \$574; licenses to operators, \$636; registration of motorcycles, \$48; licenses to dealers, \$100.

The total number of automobiles registered since 1905 is 3,519; the number registered during the past four months, 287, compared with 179 during same period last year. The total number of licenses issued to operators since the law went into effect is 4,108, and the number issued during the past four months is 318, against 184 for the same time last year. The total number of motorcycles registered since the law went into effect is 363, and the number during the past four months is 24, as against 28 for the same period in 1908. The total number of licenses issued to dealers since 1905 is 97, and the number during the past four months 16, as against 8 for the same time last year. The amount charged by the State for the registration of automobiles is \$2, license to operators of automobiles and motorcycles is \$2, and for the license to dealers \$10.

At the session of the Legislature, which but recently adjourned, a law was passed which prohibited automobiles from traversing certain roads in Bar Harbor, the most fashionable resort in the State. There was much opposition at the time and now petitions are being circulated for a referendum on the question, and the whole subject will probably be referred to a vote of the people. Should this be done, the chances are about even on the acceptance of the law.

In view of the absolute necessity for every tourist either up or down the Maine coast, passing through Portland or else climbing over the mountains, this meeting was of unusual importance to the city. The turnout was in accordance with the significance of the occasion, the merchants owning machines took this way of showing their patriotism as well as their automobile enthusiasm.



Over Sixty Automobiles Were Used by the Portlanders to Show the Boston Merchants' Association the Maine Metropolis.

## BAY STATE HAS GOOD AUTO BAROMETER

BOSTON, May 10.—Boston automobile dealers entered upon the month of May with a most satisfactory record of business transacted and of prospects for the remainder of the selling season. There is a shortage in certain types of cars and local agents and branch managers are trying to secure the release of machines allotted to other cities in order to satisfy customers, while the dealers who are able to offer reasonably early deliveries are enjoying an excellent trade. Some of the more popular cars are sold out, which means good business for those who were not quite as early in the selling campaign. The demand for high-grade cars has been good all through the Spring and continues strong, there being apparently plenty of people with \$4,000 or more to put into an automobile who have just come to the conclusion that they need motor equipment.

The dealers in the low-priced machines are also in a quandary how to supply enough cars to satisfy their customers. The low-priced machines offered this year seem to have just about hit the pocketbooks of a very large number of people all through New England, and dealers in cars selling up to \$1,500, instead of being able to do an immediate delivery business, as has often been the case in the past, are weeks behind on their deliveries.

The second-hand business is also experiencing a great boom, and the dealers who last Winter tied up their profits in second-hand cars taken in trade are now putting out these cars fast.

The effect of the satisfactory trade conditions appears in the automobile registration and licensing department of the State Highway Commission, where there is an unprecedented rush, keeping an extra force of clerks on the jump continually. For the first four months of this year, or up to to-day, the receipts of the department were more than 42 per cent. in excess of last year. The receipts to date aggregate \$91,175, against \$64,858 at the same time last year, and it is estimated that the fees will pay the expenses of the automobile registration department of

the Highway Commission and leave at least \$100,000, which by law will be used for the maintenance of State highways.

During the past month a total of \$23,586 has been taken in at the office of the commission, the receipts averaging very nearly \$1,000 for every day the office has been open. For the month of April the automobiles registered averaged 120 a day, and during the last week of the month the average rose to 135, in one single day 192 machines being registered. The registration is just about a month ahead of last year in receipts.

Automobiles have to be registered every year, but private operators' licenses are perpetual. The increase in these, therefore, is the best gauge of the spread of motoring in Massachusetts. And the private operators' licenses issued show a tremendous increase, nearly 70 per cent. more licenses of this kind having been issued up to to-day than on the corresponding date last year. The total number of private operators' licenses issued this year is 2,154. Since the first of January 2,626 chauffeurs have been licensed to drive, of this number 1,751 being renewed licenses and 875 new licenses. This is about 50 per cent. more than a year ago, and the increase is the more remarkable from the fact that this year every applicant for a chauffeur's license is given a strict examination which many fail to pass, whereas last year the examination system had not been put into effect. The increase in the number of taximeter cabs is one reason for the great number of chauffeurs' licenses issued.

The business of the Highway Commission automobile department for the first four months of 1909, compared with the corresponding period last year, is as follows:

Registrations.	1908.	1909.
Automobiles .....	10,702	14,432
Motorcycles .....	893	1,160
Manufacturers and Dealers .....	321	428
Licenses.	1908.	1909.
Private Operators .....	1,270	2,154
Chauffeurs .....	1,660	2,626
Total receipts .....	\$64,858	\$91,175

## OHIO AUTO DEPARTMENT SCORES A VICTORY.

COLUMBUS, O., May 10.—Ohio's Railway Commission has handed down a ruling which has interested automobilists for some time in regard to a controversy between the State automobile department and the express companies. The department has been shipping the heavy registration tags in quantities of 15 or 20 sets to the automobile clubs at Cincinnati, Cleveland and other cities, and has thus cut off many small packages from the express companies. This has been a saving to the State and has influenced closer relationships between the autoists and the clubs. The express companies refused to accept the larger packages, hoping thereby to secure smaller ones in greater numbers. The railway commission has decided that the large bundles must be accepted, so the express and railroad companies will have to carry them whether they wish to or not.

The Columbus Automobile Association has nearly completed the work of erecting road signs. They have been posted as far east as Zanesville, south to Chillicothe, west to West Jefferson and north to Marion.

## GOVERNOR'S DRIVER NEEDS LICENSE ALSO.

COLUMBUS, O., May 10.—Governor Judson Harmon's chauffeur had an idea blasted this week and learned thereby that the law does not allow any chauffeur, whether he operates the executive auto or not, to travel without the license tags required of private citizens. After the tags were lost from the gubernatorial car it was driven several days around without any, when stopped by police an explanation sufficing as a passport, but there was one member of the city force who doubted the veracity of the autoist, and under the stress the car is now equipped with numbers.

## WHAT DELAWARE'S LAW CONTAINS.

WILMINGTON, DEL., May 10.—Governor Pennewill has signed the bill passed by the Legislature of Delaware at its last session, amending the State automobile law. The points of difference between the new law and the old one are as follows:

Non-residents are allowed the same privileges as are accorded non-residents in the States from which they come.

The registration fee for automobiles is raised from \$3 to \$5, and the State, which receives all the money, is required to furnish registration tags, thus guaranteeing uniformity and also conformity with the legal requirements.

Motorcycles are licensed and a fee of \$3 a year is charged.

The cost of an operator's license is increased from \$2 to \$5. A dealer's license is increased from \$3, for each car, to \$5.

The time is reduced from the rate of one mile in six minutes, or 10 miles per hour, at curves and intersections of other streets or highways, to one mile in 10 minutes, or six miles per hour at curves and intersections of other streets or highways.

The new law is now in effect.

## BRIDGEPORT CLUB FAVORS AMENDMENT.

BRIDGEPORT, CONN., May 10.—Support to the proposed amendment to the automobile law which will do away with the motor vehicle commissioner and will provide registration in the Secretary of State's office, will be given by the Automobile Club of Bridgeport. This was decided upon at a recent meeting of the board of governors. The problem of a new auto law has been a pertinent one in the State for some time, and this club has joined with others to secure the most favorable action to the bill now pending.



# Making Night Driving Practical

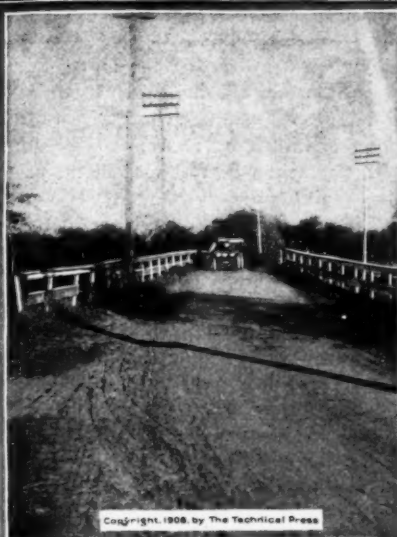
By H. L. T.

THE automobile of to-day is a servant, not a luxury. It is a private trolley car or railway train, always ready to start and to go whither trolley and railway cannot penetrate. If its owner desire it will run all day and all night with the steadiness of a locomotive. It is as ready to transport him 50 miles for a social visit as it is to go around the block.

Nevertheless, it is curious, but true, that the average automobile owner scarcely half realizes the possibilities of his own car. It is to him a land motor boat, the friend of his infrequent leisure. He uses it on Sunday and occasional days off, and he plans to return at dusk. If the nature of his trip keeps him out after supper he takes a train, for the simple reason that after dark driving is a nervous strain. If he drives slowly enough to escape the strain, it takes him "all night" to get anywhere. If he strikes his usual daylight pace, he takes a chance with every turn of the wheels.

If an amateur yachtsman should put to sea without a compass and complain that it was hard for him to find his course, he would be laughed at by his enemies and shunned by his friends. Yet the means of safety for after-dark motoring is as simple and obvious as the compass. The cost of effective lamps is but an inconsiderable fraction of the total cost of the car, and it represents all the difference between safety and genuine pleasure in night motoring and their opposites. Why should not the harassed business man, most of whose daylight hours are spent at his office or store, give himself the pleasure of a genuinely refreshing, lung-filling and nerve-quieting spin just before bed-time? If the car is equipped with the primary idea of making it independent of daylight, its owner can make supper engagements, 10, 20, even 40 miles away, and drive home with both speed and comfort at the end of a social evening.

But what equipment is required for this purpose? Let us analyze the matter. If your speed is 30 miles an hour you can probably make an emergency stop in 50 yards from the point where the car first feels the brakes. Possibly you can do it in less, but if the emergency confronts you unexpectedly it is safest to allow 70 yards or 80. This applies in daylight. At night you are watching formless objects take



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Where Two Roads Form a "Tee"



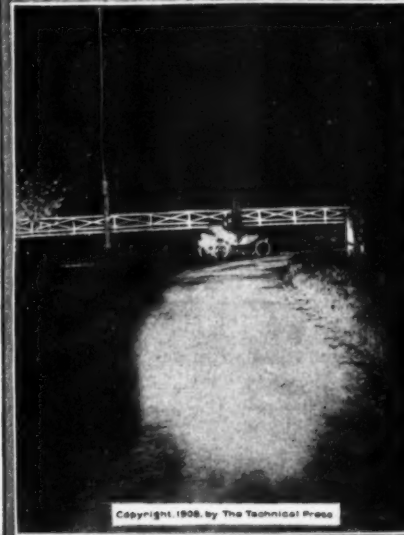
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Railroad Crossing



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Bridge Over Railroad Track at Night



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Where Two Roads Form a "Tee" at Night



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Railroad Crossing at Night

shape as they come into the lighted area of the lamps. That takes time, and a second and a half is not too much to allow the brain to identify the object and telegraph its orders to the hands and feet. At 30 miles an hour this means an additional 22 yards. In a word, to be safe at the speed mentioned, you must see the roadway plainly for a hundred yards. For a twenty-mile speed, fifty to sixty yards is sufficient, but for daylight speeds with a high-power car one hundred and fifty yards is not too much. This, be it remembered, is the distance within which objects are plainly visible, and it makes no account of the dimly lighted area beyond.

Manifestly, these ranges are higher than those reached with ordinary lighting equipment. What the increase should be is suggested by the writer's own case. My car is rated at 20 horsepower, and I average twenty miles an hour day and night in give and take New Jersey suburban territory. To the usual equipment of 7-inch headlights, I have added a 9-inch dashboard searchlight. I find that this searchlight has practically the same lighting power as the two headlights combined. For its purpose, however, it is far more effective than the two headlights, because its beam, while very intense, is less divergent than those from the headlights, and therefore carries farther. On a straight road, I set the searchlight to throw its beam on the road beyond the effective range of the headlights, and thereby increase considerably the visible field. This arrangement has the further advantage, which is generally overlooked, that no part of the visible field is so brightly lighted as to contract the pupils of the eyes. If all the lighting power were put, for example, into a pair of 9-inch headlights, the ground near the car would be so brightly lighted that the more distant area would become semi-invisible, exactly as one cannot see beyond an arc light on a dark road. This, of course, is aside from the evident advantage of the searchlight in going around curves, where with one hand on the searchlight and one foot on the accelerator, daylight speeds may be safely used.

With the sense of visual strain abolished and the roadway brightly lighted a hundred yards ahead, night driving has a peculiar charm, hardly describable to those who haven't tried it. Save for the stars above and the scattered lights of houses in the indefinite distance, the sense of detachment from the world is complete. One lives and moves in that small lighted area, and has the sense of pursuing it endlessly like a flowing stream.

It is a familiar fact that the more intense and rapid the appeals to the senses—whether sight, sound, or feeling—the more rapidly are mind and body fatigued. The daylight panorama, delightful though it be, makes demands on the nervous organism that are eliminated when darkness shuts the surroundings from view. The night coolness, the absence of traffic, the brooding stillness, the dreamlike possession of half-seen images on either hand, and the ceaseless flow of the luminous road beneath, have a wonderfully soothing influence, even to the driver when the speed is moderate.

If there is a reason for haste, the swift pursuit of that flying beam of light, the instant alertness for what may spring into vision at its farther end, the swift adjustment of pace to each new feature of the road, the play of throttle and spark to get the most from the car, while yet being prepared at any moment to pull up within the distance visible, all these have a quality more stimulating than daylight driving in proportion as the field of vision is more limited and the need for concentration greater.

Out of curiosity to see what could be done in the way of photographing with an equipment suitable for the most powerful cars, I lately fitted my car with a set of 10-inch headlights and searchlight, and 7-inch side lights. With this somewhat formidable equipment (it must have looked like a war machine to those who saw the quintuple blaze approaching) and with the good-natured co-operation of some friends, I secured in two or three evenings the set of photographs which accompany this article. All of them were taken with a 5x8 camera, using a wide open stop, and exposures from twenty-five to forty minutes. The photographs are engraved just as the negatives made them,

and the lighting effects will be recognized as out of the ordinary. It is evident that the color of the objects has much to do with their visibility. Even the strongest lights will not brighten a wet road. The small white house in one of the most striking pictures could easily have been double the distance photographed and would still have been distinct. The photograph of a railroad crossing required the longest exposure, on account of the dip of the road to the tracks. It was taken in full moonlight, as the silhouette effect of the trees plainly shows.

Many motorists have had the disagreeable experience of finding that, while their lamps are reliable, the gas supply is not. So long as it contains gas there is, of course, nothing more reliable than the pressure tank, the only fly in the ointment being the occasional uncertainty of the gauge which is supposed to show the pressure. When considerable night driving is done, however, stored gas becomes expensive, and it is not always that an exchange station is at hand when it is wanted. On the other hand, the cost of carbide is nominal and the supply is universal. With a good automatic generator, the only care required is to empty the dry lime dust and refill with carbide and water, which is the work of a few moments. In order, however, to get entire satisfaction from the generator, it is very essential that the piping be properly arranged. The gas coming from the generator carries with it a certain amount of moisture, which in cold weather is condensed in the piping. If the latter is the usual soft copper tube, it does not hold its shape and forms pockets in which water obstructs the flow of the gas, causing the unbearable flickering sometimes seen. The piping should be not less than one-quarter inch inside diameter, or what is known as one-eighth inch water pipe size, and it should be brass, not copper. Piping of this character can be arranged to drain both ways to a trap or dead end near the generator, where a spoonful or two of the water may collect without causing the lights to flicker. Rarely the gas outlet from the generator will need to be cleaned out with a stiff wire, a fact easily disclosed by blowing into it through a rubber tube. Occasionally, the hair filter through which the gas passes on its way to the generator outlet should be fished out and shaken clean. Very occasionally the water drip may become obstructed and need to be poked clear.

If the gas jets always burn at their normal height, the burner tips will seldom clog. If they are turned low, soot accumulates in the burner orifices, causes distortion of the flame, possibly causing it to strike and crack the lens mirror. I find it easy to clean the burner tips either by blowing out with compressed air, or by poking a fine iron wire, about No. 32 gauge, through the orifices. A pocket mirror assists in this operation. The lens mirrors themselves need occasional cleaning, just as a window does, but oftener. A half-and-half solution of denatured alcohol and water is excellent for this purpose. It is absurd to pay for powerful lamps and then sacrifice a quarter of their light through failure to keep the burners, lens mirrors and front doors in condition.

Note.—The car with which the accompanying photographs were taken was equipped with two 10-inch Rushmore headlights, a 10-inch Rushmore searchlight, two 7-inch side lights and two Rushmore generators.

## BUSES AS RIVALS TO PITTSBURGH TROLLEYS.

PITTSBURGH, PA., May 10.—Automobile buses to-day started in business as the first rivals the Pittsburgh Railways Company has ever had. Two large machines, with a capacity of 22 passengers each, began operation at 6 o'clock this morning between the incline of the Duquesne Incline Plane Company on West Carson street and the center of the business district. The line has been organized as a direct result of the refusal of the Railways Company to accept any longer the incline transfers. The Duquesne Heights and the Mt. Washington boards of trade made a demand for a re-recognition of the transfer system and when they were refused, used their influence to form the bus-line. The cars will be run from the city to the incline in five minutes, one minute less than that used by the trolleys.



# What the Clubs are Doing These Days

## PHILADELPHIA-PITTSBURG ROUTE INSPECTED.

PHILADELPHIA, May 10.—In preparation for the Quaker City Motor Club's endurance run from this city to Pittsburg and return, June 14 to 18, Dr. J. R. Overpeck, the official pathfinder, left this city on Saturday morning in an American Traveler on a tour of inspection to lay out the route. As a result of the strenuous experiences of the Motor Club of Harrisburg in its recent endurance run, a change was made in the course formerly considered for the first day, and instead of going to Williamsport via Pottsville and over the mountain through Shenandoah and Bloomsburg, the itinerary will take the contestants via Shamokin and Sunbury, rejoining the original route at Muncy. The explorers with Dr. Overpeck, George W. Parker at the wheel, Lewis H. Vogel, of the Stoye-Vogel Company, agent for the American cars, and W. C. Jackson, reached Williamsport on Saturday evening. They were assured by the Board of Trade that a sumptuous entertainment is being prepared for the Quaker City autoists.

The run has been generally received enthusiastically by county road commissioners who desire the route of the new trans-state highway and the officials of Cambria County have sent word that they will have the old Philadelphia-Pittsburg pike in fine condition by the time the run reaches that part of its course.

Orphans' Day is being seriously considered by the Quaker City Club and E. H. Lewis, chairman of the routes and tours committee, has started the subject a-rolling. The Autocar Company has promised enough cars for at least 100 children, and it will be the hope of the club to get enough to carry 1,000 out to Willow Grove.

## DELAWARE WILL HAVE A SEALED-TIME RUN.

WILMINGTON, DEL., May 10.—From the "Court House" to the "State House" will be the route of the "sealed-time" run of the Delaware Automobile Association on May 29. Restricted to members of this body, the cars will be run from this city to Dover via Elsmere, Marshalltown, Newark, Cooch's Bridge and Glasgow. They will return via Townsend, Odessa, Delaware City and the State road into this city, a course of 106 miles, with several conditions of roads. The drivers will run well under the legal speed limit, but they will not know the exact running time until the finish, to be arranged previously by a committee. There will be checking stations at several points en route, where time will be taken, as well as at the start and finish, and at the noon control. The first car will start at 10:30 A.M., and others will follow at one-minute intervals. It is planned to have Governor S. S. Pennewill receive the tourists at the State Capitol.

## LARGE ENTRY LIST FOR NORRISTOWN RUN.

NORRISTOWN, PA., May 10.—That the 400-mile run of the Norristown Automobile Club will be one of the largest entered contests of its kind ever held is shown by the number of automobiles already upon the lists, with many more yet to be heard from. Forty-eight cars have thus far been promised and it is expected that 75 will start on the trip across the mountains to Hagerstown, Md. Philadelphia tradesmen, as well as local dealers, have entered 21 cars, and private owners have put down 27, for the two classes will be distinct. Gratifying results are expected as the result of giving the club members a better chance in the competition. H. W. Gitt, treasurer of the Hanover and Littlestown Turnpike Company, has agreed to issue free passes over the pike to all participants in the run, and the Maryland authorities have agreed to raise the tag embargo for two days.

## CANADIAN AUTOISTS TO CURB CHAUFFEURS.

MONTREAL, May 10.—Drastic action has been taken by the Automobile Club of Canada to curb rash acts of chauffeurs, employing the blacklist as the weapon. At the fifth annual meeting of the organization, held in Montreal, the matter of joy rides and reckless drivers was a subject for important consideration, and resolutions were adopted providing for the enrollment upon a blacklist of the names of all chauffeurs found guilty of misdemeanors, such as misappropriating the cars of their employers. Going a step further, it was agreed that any member employing or re-engaging a man whose name had been put upon this list would be suspended from the club.

D. McDonald, who has piloted the body as its president for the past three years, declined to accept a re-election, and the following officers were chosen: President, Clarence F. Smith; vice-president, U. H. Dandurand; secretary-treasurer, G. A. McNamee; directors, D. McDonald, F. H. Markey, F. H. Anson, L. C. Rivard, A. J. Dawes, Eugene Tarte, W. A. Edwards and William Carruthers.

## PENNSYLVANIA'S YOUNGEST ELECTS OFFICERS.

WEST CHESTER, PA., May 10.—At last week's election of the newly organized Motor Club of Chester County the following officers were chosen to serve during the ensuing twelve month: President, Guyon Miller, Downingtown; first vice-president, Edwin T. Moore, Coatesville; second vice-president, George K. McFarland, West Chester; secretary, Fred W. Speakman, Coatesville; treasurer, Dr. Horace S. Scott, Coatesville. Dr. Edward Kerr, of Downingtown, was named as chairman of the roads committee, and Walter E. Greenwood to head the law committee. The 65 members of the club voted as a unit to join the Pennsylvania Motor Federation.

## COMMITTEE APPOINTMENTS OF JERSEY CLUB.

NEWARK, N. J., May 10.—President W. C. Crosby of the New Jersey Automobile and Motor Club has announced committees: Membership—G. H. Simonds, chairman; W. I. Fisk, F. G. Stone, House—G. O. Groebe, chairman; A. S. Marten, E. B. Ward, P. E. Heller, C. E. Fisher. Legal—Dr. J. R. English, chairman; H. D. Bowman, F. H. Tichenor. Auditing—C. A. Westervelt, chairman; L. Frisbee, C. Callard. Legislative—J. H. Wood, chairman; R. C. Jenkinson, C. H. Bissell. Good Roads—A. S. Marten, chairman; J. H. Dawson, J. H. Edwards. Contest and Club Run—H. A. Bonnell, chairman; J. H. Wood, DeW. C. Reynolds.

## NUTMEG STATE AUTOISTS ELECT OFFICERS.

NEW HAVEN, CONN., May 10.—At the third annual meeting of the Connecticut Automobile Association, held in this city last Saturday, the following officers were chosen: President, W. F. Fuller, Hartford, re-elected; vice-president, F. T. Staples, Bridgeport; treasurer, W. T. Dill, New Haven; secretary, John M. Brooks, Litchfield County. The membership in the body has increased to 1,071 during the past year.

## COGHLIN, AS USUAL, RE-ELECTED PRESIDENT.

WORCESTER, MASS., May 10.—John P. Coghlin, for several years past the president of the Worcester Automobile Club, was re-elected at the annual meeting held recently. The other officers chosen were: Vice-president, Fergus A. Easton; secretary, George E. Stompsen; treasurer, Herbert P. Bagley; board of governors, three years, William F. Whipple, Charles Case.



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### WITH ONE GALLON OF GASOLINE.

The recently held one-gallon efficiency contest will go down into history as the one event of New York's "Carnival Week" which was really worth something to the great rank and file of small automobile owners and prospective buyers. To these, it proved many things, chief of which were the great advance made in tire construction in the past two years and the economy of the automobile as a means of transport.

In the whole day's running but two cases of tire trouble developed, which is remarkable in view of the very light-weight tires used on many of the cars for the purpose of adding to the mileage, many of these actually being much too small for the load they were carrying. No greater proof of the advance in tire construction could be given than the way in which these undersized tires stood up to the work.

Of engine troubles, there was none; of transmission difficulties there was no evidence, similarly with other parts of the car which might be mentioned in detail; in short, the cars as a whole performed perfectly, demonstrating as has never been done before the real worth of the automobile as a reliable mode of transportation.

To the man considering the purchase of a machine, say a man of moderate means, the contest was startling in the facts relative to economy with which it fairly bristled. First, twenty machines went an average of nearly twenty-

four miles without any mechanical troubles; second, without any tire troubles; third, without any electrical worries; fourth, these machines carried on the average over four passengers at a cost for fuel of but 1.4 mills per passenger per mile. Put into other and more intelligible language, this means that an equally careful driver may carry seven people one mile for a cent, or one person seven miles for the same cost. As a fair estimate, other expenses might be put at twice this, the total three times the above, or seven persons carried one mile for three cents opens up the wonderful possibilities of the automobile, for at this figure the machine, with many granted superiorities, such as making its own track, competes with other forms of transportation.

The committee in charge of the week's festivities are to be congratulated on placing this event in the hands of a competent and far-sighted body of engineers, who managed it in such a way as to bring out the real lesson: the value of the automobile as a means of cheap and rapid transportation for the masses.

A contest of this sort is to be commended, and will be of value whenever and wherever run off, providing that the requisite and valuable information is as carefully collected as was done in this case. The one regrettable feature is that the amount of fuel furnished was not greater, so as to make the contest more in the nature of an extended tour. A similarly conducted test on five gallons of fuel, by making the possible sources of internal loss smaller relatively, should be of more value, or if this made the thing too extensive, the amount could be reduced to two gallons, thus putting the contest on a par with that of 1906. In this way the really valuable advances in construction in the past three years could have been deduced from the results.

It is said of the Four-Inch race, held in Southern England last summer, that it was the most instructive contest, to English and Continental engineers, ever held on the other side of the water. When all of the data taken from the cars will have been given out, as, for instance, the figures for windage area, gear ratios, etc., possibly a similar statement will be true of this race. Be that as it may, the truth stands that a number of points have been uncovered, which will be incorporated in next year's cars. So, in the long run, the public will get the benefits accruing from this scientifically conducted contest.

\* \* \*

### SPREAD OF ROADS BUILDING.

For many a year did the lowly cyclist argue and plead and spend his money in furtherance of the cause of good roads building. Though he once totaled over a hundred thousand in organized form, and did accomplish much in the way of actually securing roads and more in the sowing of seed for future harvesting, his efforts now appear puny compared with what the automobilists are bringing about in nearly every State of the entire country.

Statistics on the roads built in the year 1909 will produce totals and tell of expenditures which are not realized at the present moment, even by those who are closest in touch with the progress of events. But the problem still remains of finding the best road for the time-saving motor-driven vehicle, a blessing to mankind and a welcome deliverance to the sagacious equine that has served us so faithfully and for so many centuries.



## APPROVAL OF GOVERNOR HUGHES SEEMS PROBABLE

**A**LBANY, N. Y., May 11.—Based upon the arguments presented to-day before Governor Hughes for and against the Allds-Hamm automobile law, it would appear a certainty that the chief executive is not likely to withhold his signature as a result of the special hearing asked for by the National Highways Protective Society. When the hearing came to a close there were several speakers yet to be heard from who would have talked in favor of the proposed law, and since the Governor asked that they present in writing before the close of the week any opinions which they might care to express, the inference is that the signature will not be inscribed until the first part of next week.

Judge Charles S. Whitman, of New York City, as attorney for the "protective society," made the chief argument for the opponents of the bill, and his strong point was that his experience on the bench (which has not been so very extensive) had convinced him that a speed limit was needed to properly enforce the law. Yet he could not deny that the present law with miles-per-hour limitations was constantly violated. The leading argument for the bill was made by Charles T. Terry, who combined the interests of the A. A. A., the State body and the N. A. A. M.

Governor Hughes did not seem to be much impressed with the arguments of the opposition, though he tried to maintain a judicial attitude and gave no indication of what his ultimate action would be. He asked Judge Whitman if many of the accidents did not occur when the rate of speed was not being exceeded. Judge Whitman thought not. He also asked if the chief point in all the trials was not the question of whether the speed limit was exceeded rather than whether the driver was negligent or reckless. Judge Whitman admitted this, but held that it was a clearer case if that fact could be proven.

Henry Clews, president of the "protective society," opened the argument for the opposition. His brief remarks included an objection to leaving the matter of traveling at 30 miles or less to the discretion of the chauffeur.

W. C. White, an attorney of Scarsdale, said that the high-powered automobile had driven the farmers and people from the highways of Westchester County.

W. H. Walter, of the professional chauffeurs' association, objected to the bill on the ground that chauffeurs were taxed \$5 for the "privilege of earning a living." He argued for a rigid examination. Otherwise he did not seem to be opposed to the bill.

The West End association, of New York City, had its representative in President Van Dyck Card. He contended, like the previous speaker, that no conviction can be obtained when a speed of less than 30 miles an hour was maintained.

F. E. McEwan, representing automobile tire makers, opposed only the section prohibiting permanent anti-skidding devices.

Oliver A. Quayle, chairman of the legislative committee of the New York State Automobile Association, then introduced President H. A. Meldrum, who simply referred to the fact that there were over forty clubs in the association, and they were located in all parts of the State, with a total membership of thousands.

Colgate Hoyt, ex-president of the A. C. A., stated his organization had studied the bill and heartily approved of it. Alfred Ely, chairman of the club's law committee, talked at length.

A. J. Phelps, of Watervliet, N. Y., representing an association of road drivers, said that the horsemen were satisfied.

Master of the State Grange Godfrey, of Olean, said that while there might have been a few protests filed by members of the grange, he expressed positive belief that the majority of the grangers believed it to be a move in the right direction, and that those who dissented had not made a sufficient study of the new measure. Mr. Godfrey stated that the law could be improved upon, and undoubtedly would be at future sessions of the legislature, but, taken as a whole, it met the needs of the situation. He referred to the fact that many reckless drivers were eliminating themselves, and in time all of them would disappear from the roads.

Peter Kiernan was an unexpected speaker in stating that the accident and casualty companies favored the bill, for he believed that the automobile associations would assist in reducing the number of claims by aiding in the enforcement of any reasonable law, and he considered the proposed one as sane.

Among those who still remained to speak when the hearing closed were Charles Clifton, president of the A. L. A. M., and Percy Owen, of the New York Trade Automobile Association.

The New York State Automobile Association was exceptionally well represented, the list including the following: Buffalo, J. M. Satterfield, Laurens Enos, George Enos; Rochester, Bert Van Tuyl, secretary of the State body; Albany, M. L. Ryder, J. C. Fitzgerald; Auburn, S. C. Tallman; Norwich, L. A. Babcock; Troy, Alonzo McConihe, E. S. Platt; Saratoga, C. B. Kilmer; Schenectady, J. Y. Yelveton, B. A. Burtiss; Oneonta, G. B. Baird, L. D. Butts, O. Van Etten; Kingston, Jay Terry; Tarrytown, W. K. Hadley; Bronxville, F. H. Elliott; Long Island, Dr. W. P. Richardson; directors at large, H. A. Meldrum, Oliver A. Quayle and A. G. Batchelder.

The New York Trade Association had a large delegation, which included President Frank Eveland, Percy Owen, Harry Fosdick, Inglis Upperco and Secretary W. J. Lee.

## WRIGHT BROTHERS ENTHUSIASTICALLY WELCOMED HOME

**W**ILBUR and Orville Wright, the two Ohioans, arrived home Tuesday on the *Kronprinzessin Cecilie*, accompanied by their sister, Miss Katherine Wright. The welcome as the big ship ploughed its way up the North River to the pier in Hoboken was in marked contrast to the unostentatious manner in which Wilbur Wright left for the other side over a year ago. European triumphs and associating with crowned heads has made little impression on the innate modesty of the level-headed Wilbur, who has been receiving the recognition of his achievements as though it were a more difficult task than the solution of aerial travel. Equally retiring in disposition is Orville Wright, whose successful American efforts were so unfortunately interrupted by the accident at Fort Myer, Va., in September last.

A delegation from the Aero Club of America met the incoming steamship, and Wednesday noon a midday luncheon was held at the Lawyers' Club, 120 Broadway, with Vice-President A. Holland Forbes presiding in the absence of President Cortlandt Field

Bishop in Europe. In the course of his remarks, Mr. Forbes said:

"All the arts of war and peace have their heroes, and to the end of the world men will be hero worshippers and will vie with each other in the honors that they pay to great achievements. The present century finds us aspiring to a new sphere of thought and action, and from many luminaries there are welcome rays of light to guide our winged ways. I have a keen realization of the wonderful patience, the marvelous genius; the dangers, and the responsibilities of our distinguished guests; and the honor that is mine in welcoming home two of the honorary members of the Aero Club of America, Wilbur Wright and Orville Wright."

Late in the afternoon the Wrights left for their home in Dayton, O., and after a short visit, they will go to Fort Myer, where Orville Wright will renew his contract with the U. S. Government, assisted, of course, by Wilbur. The latter will return to Europe in August next, going first to Berlin, where arrangements have been made for some flights.

## ELEVEN ENTRIES FOR COBE AND INDIANA TROPHIES

**C**HICAGO, May 11.—Two big gangs of men started work this morning at Crown Point and at Lowell, Ind., repairing the course which will be used for the two road races of the Chicago Automobile Club next month—the Cobe cup and the Indiana trophy. The contractors have until June 5 to complete their work or forfeit \$500 a day for each day after that, so it means hustle all the time. One gang started in at Crown Point building the new strip of road that connects the east and west legs, while the other is working out of Lowell at the other end of the circuit. It is a stupendous task, for the contractors have to convert the country macadam roads into boulevards with a smooth top dressing in which taroid is the main factor and which is expected to make a surface that will permit of unlimited speed, for it is the ambition of the Chicagoans to crack a record, and with that idea in mind they are prepared to spend \$30,000 to get a circuit that will be surpassed by none.

The usual objection to repairing the course came up Saturday just as the contractors were preparing for their task. A Lowell citizen named Foster appeared before the county commissioners and protested against the roads being spiked, claiming that while the result was satisfactory for the time being, that later on the road would be in worse condition than before they were touched. He asserted that the taroid used to fill up the holes would be pulled up by the hoofs of the horses. The contractors,

however, convinced the commissioners that it is the intention to make the circuit permanently good, so that no further trouble is anticipated from now only.

Success for the races is guaranteed by the way the entries are coming in. Up to last night there had been eleven actually made for the two events, accompanied by the cash. Five of these are in the Cobe cup and six in the Indiana trophy, while there are other prospectives that make it certain that there will be full fields in both races. The latter part of the week the Buick company filed six nominations, three in each event, naming Strang, Burman, De Witt and Chevrolet as its drivers. Chevrolet will drive only in the Cobe cup, while De Witt will be only in the light-car race. On Friday four nominations were made by the McDuffee Automobile Company, of Chicago, agent for the Stoddard-Dayton, which named two cars for each event. In the Cobe cup the new 60-horsepower speedster model will represent the Stoddard, with C. A. Englebeck, of Chicago, and Bert Miller, of Dayton, as drivers.

More entries are expected this week. The Chalmers-Detroit nominations are expected, while the Nordyke & Marmon Company, through H. H. Rice, who was in Chicago Saturday, states it will put two cars in the Indiana trophy, with Harry Stillman and R. W. Harroun as drivers. Henry Ford, too, states he will make a couple of entries.

### DIAMOND MAKES RUBBER COVERED CABLES.

**AKRON, O., May 10.**—"How many autoists know that poor insulation, due to aging of rubber, allows the current to leak and produces a weak spark?" "How many know what constitutes quality in ignition cables?" These questions are now being asked by the Diamond Rubber Company officials, to obtain serious consideration of the fact that good service from these wires is as necessary as good service from tires. The Diamond company erected a large factory, containing over five acres of floor space, two years ago, to be devoted entirely to the production of insulated wire of all sizes. For the automobile trade its principal products are plain and braided igniter cables, charging cables and connecting wires.

In speaking of the new plant and its work, O. J. Woodard, of the Diamond company, says: "We are making primary and secondary igniter cables of a quality which resists breaking at the terminals, resists deterioration and the troubles which arise therefrom. We have found that much less attention than the subject deserves has been paid to the cable question by the trade in the past; but there is seldom a man who is not interested when the possible range in quantities in this field and the results to be expected are once made clear.

### TITUS ALSO WANTS TO SELL AEROPLANES.

**NEWARK, N. J., May 10.**—Residents of this city must soon become accustomed to the sight of aeroplanes flying over the streets, for negotiations have been opened by Fred J. Titus and the Wright Brothers which may lead to the former bicycle champion, and now president of the Fred J. Titus Automobile Company, becoming the sole agent for Wright aeroplanes in this State. Mr. Titus knows both of the Wright brothers, having competed with them on tracks in the bicycle days, and he will endeavor to have them make exhibition flights in this city in the near future. The incorporation papers of the Titus Company permit it to handle aeroplanes and airships, as well as automobiles.

### A. L. WESTGARD ORGANIZES TOURING BODY.

A. L. Westgard, formerly secretary of the Bureau of Tours of the Automobile Club of America, has organized under the laws of New Jersey a corporation to be known as the Touring Club of America, though the same name was adopted by a New York State corporation registered at Albany over a year ago. The Touring Club of America, of New Jersey, is capitalized at \$10,000 and a New York headquarters will be opened.

## ROUTE TO SEATTLE SURVEYED; ALL READY FOR EVENT

**N**EW YORK, May 10.—The route for the "Ocean-to-Ocean" contest has been completely mapped. The event will start June 1, and arrangements have been made with the Western Union Telegraph Company for a wire to City Hall which will flash the signal from President Taft to open the Alaska-Yukon Exposition and start the contest at the same time.

It is stated by the promoters that there will be between ten and fifteen starters, and it is known that a number of cars have entered without announcing the fact. Ford, Stearns, Acme and Isotta are among those mentioned. Under the revised rules the cars will have to stop six times for periods of 12 hours each, between this city and St. Louis, after which they will run with less restriction. Checking stations have been established at the

following points, where the drivers will have cards signed: Poughkeepsie, Albany, Fonda, Syracuse, Buffalo, Erie, Cleveland, Toledo, South Bend, Chicago, Bloomington, St. Louis, Centralia, Kansas City, Manhattan, Oakley, Ellsworth, Limon, Denver, Cheyenne, Rawlins, Granger, Montpelier and Pocatello.

Mills & Moore, the New York managers, have scheduled a train which will duplicate the Wall Street Special, to start June 5, and overtaking the contestants at St. Louis, stopping one day. Two days will be spent in Denver, and then four in the Yellowstone Park. The automobiles will again be seen at Boise, and the train will be at Seattle for the finish, staying five days. The return across the continent is intended to be a record-breaker, the railroads combining to send the special through fast.



## FRANCE AND ENGLAND MAY ALTERNATE ON SHOWS

PARIS, May 8.—England and France have gotten together for a friendly confab on the knotty show question, with the result that there is a possibility of the problem being settled by the inauguration of simultaneous shows every two years in London and Paris. The meeting, which was of a purely unofficial character, was held in Paris at the residence of M. Delaunay-Belleville. The British trade was well represented with delegates from Daimler, Milnes-Daimler, Armstrong-Whitworth, Lanchester and Dietrich factories and the president and secretary of the Motor Manufacturers' and Traders' Association. A small group of constructors, the leaders of which spoke for Panhard, Peugeot, Delaunay-Belleville and Dunlop, were present in the name of the French industry, or, more correctly, for that section which is opposed to an annual show in Paris.

The points on which there was agreement were that England should hold its show this year as previously announced, arrangements which had been made some time ago preventing an abandonment now. In 1910 there should be an automobile show in both London and Paris, but in 1911 no show should be held in

either city, this rule of simultaneous shows on alternate years to be continued henceforth. Among the minor matters was an agreement that foreigners exposing at the Paris Salon should be accorded the same treatment as the home firms, which would necessarily abolish the system of drawing lots among a select number of old-established French firms for the best and most central positions. If a show was held in Paris this year despite the efforts of the constructors to prevent it, British firms should refuse to take any part in it. This withdrawal, however, would not cause any loss, for England has never averaged more than two firms at the annual Paris motor exhibitions.

Although the agreements were in no way official or binding, they have their importance in the fact that they will show to the French trade a practical means of bringing to an end the present internal strife. If it is shown that England is willing to forego an Olympia show every other year, the principal argument against holding the French Salon annually as before will have been removed. This appears to be the ground of a working basis, and will doubtless be adopted by the French club.

### BREYER MAY MANAGE DIEPPE RACE.

PARIS, May 8.—There is a possibility of a road race at Dieppe this Summer, just as in 1907 and 1908, and with Victor Breyer again as manager. The French club has, of course, gone out of this line of business and will have no other interest in the race than to come and watch how it can be run without them. The idea was put forth by a number of Dieppe business men and officials to hold an open race, for private owners, professional drivers, and such manufacturers as cared to come in. There should be neither weight limits nor restricted bores and strokes, any type of machine being eligible.

Owing to the numerous government formalities which have to be gone through, it is practically impossible to hold the race, as originally intended, late in June or early in July. It is therefore proposed to put it on the program for the month of September. If this is agreeable to the Dieppe party, the matter will be pushed ahead and government permission asked for. There is just a possibility of this being refused; but in view of the practically unanimous local desire for the race chances are in favor of it being held.

Entries will not be difficult to find, for there are in and around Paris at least two score machines constructed and raced in 1907 and 1908 which could rapidly be put in shape for another high-speed test. British participation is certain, one leading firm at present having a team of three cars in racing condition having given the assurance that they will be entered if the race is held. Germany, Italy and Belgium can also supply cars which, if not entered directly by their builders, could readily be placed in the hands of private individuals for the purpose of racing.

### ARE OMNIBUSES LOSING POPULARITY?

The total figures for the London passenger traffic of the week ending April 10 show that the net change for every form of service has increased over that of last year with the single exception of the omnibuses. The difference would not be noticeable if small, but actually it is so large as to be the most prominent thing in the whole summary. Such a condition naturally leads to the question, are the omnibuses losing their popularity? The table follows:

Omnibuses—	Traffic for Week.	Total Traffic.	Change.
London General and Allied Companies .....	\$172,885	\$2,120,000	—\$116,100
All others .....	.....	.....	.....
Tubes, totalled .....	108,000	1,850,000	+ 59,400
Tramways, totalled .....	235,000	2,825,000	+ 166,000
Shallow Railways, totalled..	117,000	1,910,000	+ 105,000
Grand total .....	\$632,885	\$8,705,000	+\$214,300

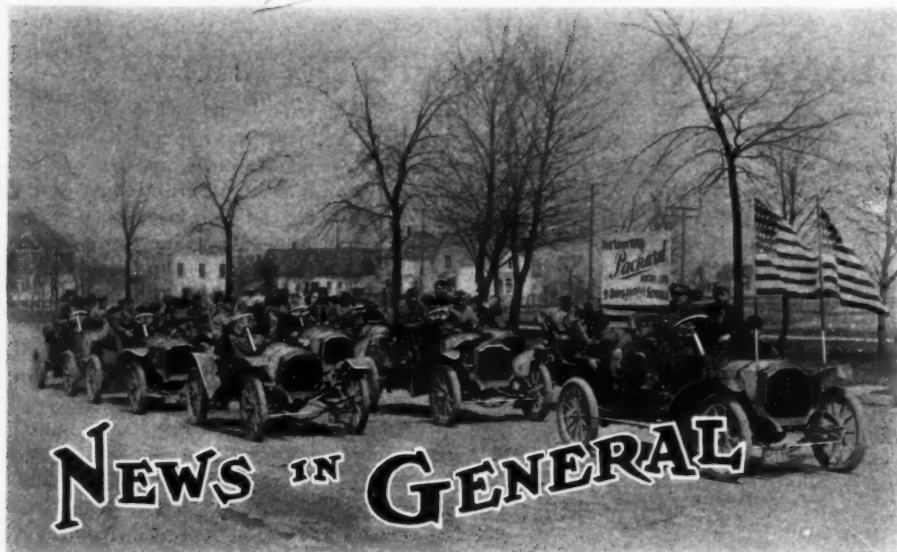
### FRENCH AUTO TRADE STATISTICS.

An official table of France's export and import trade during the first three months of the present year shows that the worst has passed as far as the industrial depression is concerned, as the figures for export reach 34,966,000 francs, in comparison to 29,810,000 francs in the same period of 1908. A decrease in trade done with the United States, Germany and Brazil is noticeable, while on the other hand England has not only bought but also sold many more cars in France than previously. The interesting figures run:

	January, 1909.	February, 1909.	March, 1909.
<b>EXPORTED TO</b>			
England .....	15,169,000	13,054,000	13,054,000
Argentina .....	3,435,000	1,244,000	1,244,000
Belgium .....	3,337,000	1,262,000	1,262,000
Germany .....	2,077,000	2,317,000	2,317,000
Algers .....	2,077,000	1,071,000	1,071,000
United States .....	1,805,000	3,745,000	3,745,000
Russia .....	983,000	650,000	650,000
Switzerland .....	798,000	303,000	303,000
Italy .....	772,000	544,000	544,000
Spain .....	732,000	544,000	544,000
Brazil .....	397,000	1,666,000	1,666,000
Turkey .....	311,000	207,000	207,000
Austria .....	166,000	67,000	67,000
<b>IMPORTED FROM</b>			
Germany .....	516,000	531,000	531,000
Italy .....	340,000	317,000	317,000
England .....	249,000	99,000	99,000
Belgium .....	210,000	182,000	182,000
Switzerland .....	109,000	49,000	49,000

### FIRST AEROPLANE RACE FOR FRANCE.

PARIS, May 8.—France will have its first competitive aeroplane event on Sunday, May 23, in connection with the opening of the Juvisy aerodrome, in the suburbs of Paris. The ground, which was fitted up last Fall as a training place for budding aeronauts, has never been officially inaugurated owing to bad weather and other causes. It is now intended to make the opening ceremony a matter of some importance, and to mark it by the first real race ever held in the neighborhood of Paris. The aviator making the fastest time over a course of 12 kilometers, consisting of flying around two flags 656 yards apart ten times, will be entitled to the first prize of \$1,000 in cash. Lots will be drawn for order of starting, and 15 minutes will be allowed after the starting time to get over the line in full flight. If the line is not crossed in this time the next starter will be sent away. Stops are allowed, but, of course, will be marked against the aviator, the prize being for the fastest performance. One of the French-built Wright machines, owned by the Aerial Company, has already been entered for the contest. It is expected that there will be about six or eight starters.



The Corps of Packard Testers Who Have Driven 1,000,000 Miles.

Above is shown the testing corps of the Packard Motor Car Company of Detroit. Will Birmingham is chief of the squad, and what he doesn't know about driving Packards isn't worth knowing. Incidentally, the whole crew are not bad at the same work, having driven Packard cars an aggregate of one million miles, equal to forty times around the world, without any serious accidents. They are happy because they have just finished putting their seal of approval on the last of the 1909 output of 2,300 cars, nine days ahead of schedule.

**Warner Auto-Meters in Great Demand.**—Although considerable enlargements were recently made to its factory by the Warner Instrument Company, of Beloit, Wis., yet the demand for its speed-recording instruments has been so great that it is impossible to fill orders. The plant is working day and night shifts, and in addition, the day force stays on duty until 9 o'clock in the evening three times a week. The automatic machines are working 23 hours a day, and although one of them turns out 124,200 rivets a week, it is unable to supply the need. Seven thousand sapphire jewels were recently received from Switzerland. The concern is behind its orders for flexible shafts to the number of 3,000, according to officials at the factory. As an indication of the size of its business, the Warner company is said to pay \$5,000 a week for the clocks which it attaches to one style of instrument.

**Concerning Snap Button Injunction.**—Judge Lacombe of the United States Circuit Court, in New York, has denied the motion for a preliminary injunction by the Allen Auto Specialty Company, of New York City, against Charles E. Miller. The plaintiff alleges that Miller should be forbidden to deal in tire jackets or cases manufactured by the Gilbert Manufacturing Company, of New Haven, Conn., because these cases infringe certain patent rights held by the Allen company. Miller is the nominal defendant, case being taken up by the Gilbert company. Judge Lacombe said that the motion involves a construction of a claim which should not be decided in advance of the final hearing.

**New Concern to Build Federal Cars.**—The Industrial Automobile Company, of Elkhart, Ind., has been organized, and has bought the entire stock, material and rights of the Federal Automobile Company, of Rockford, Ill. It has nearly finished the erection of a new factory and will occupy it within a week or two, commencing the building of Federal cars. The machines have two-cylinder opposed water-cooled motors of 14 horsepower, sliding gear transmissions, multiple disc clutches, and 36-inch wheels, selling for \$800. An air-cooled motor of 16 horsepower with the other features similar to the present car will soon be installed in a new model.

**Anderson Buys Westerfield.**—The motor and accessory business of the Westerfield Motor Company has been purchased by the recently organized Anderson Motor Company, of Anderson, Ind., and will continue to manufacture Westerfield motors and transmissions in a new brick plant now in course of construction. E. F. Dice, secretary and general manager of the new company, was designer and superintendent of the Westerfield company for the past three years. T. C. Werbe is president and treasurer and U. G. Hudson is vice-president.

**Chicago Gas Company Buys P. & S. Skimabouts.**—Paul Picard, manager of the Chicago branch of the Palmer & Singer Manufacturing Company, has just sold five skimabouts to the Peoples Gas Light & Coke Company, of that city. The gas company required a convincing demonstration, taking a car for a week, with Picard's driver, but with the gas men caring for it. The routine which was covered included running about 61 miles a day, and careful track of its work was kept. At the end of the week five of the cars were ordered.

**New Factory for Huppmobile.**—The Hupp Motor Car Company, of Detroit, makers of the little Huppmobile, is to have a fine new plant, which will embody some new features. It will be located at Jefferson and Canton avenues, and will be U-shaped. Each wing will be 350 feet long and 50 feet wide, and the connecting portion will be 131 feet long and 60 feet wide. The raw material will enter at one end and the finished car come from the other, with a capacity of 25 when worked to the limit.

**Wheeler & Schebler Have New Offices.**—In their building at Shelby and Sanders streets, Indianapolis, newly fitted offices have just been occupied by Wheeler & Schebler, manufacturers of Schebler carbureters and the W.S. magneto. The concern is doing a tremendous business as shown by the activity in its shipping department. Only recently, two prominent manufacturers of automobiles have ceased to make their own carbureters and have adopted Scheblers.

**Clark Carriage Company to Build Bodies.**—With the growth of a demand for high-class body work the Clark Carriage

Company, Amesbury, Mass., announces its entry into the field of automobile body builders. Limousines and landaulets will be specialties, and new machinery has been installed to give the best facilities. An experience of a quarter of a century will be behind the new department, continuing the carriage business as before.

**Barndt-Johnston Company Increases Capacity.**—New machinery for the manufacture of automobile metal bodies has been installed by the Barndt-Johnston Auto Supply Company, of Columbus, O. The facilities for production have thereby been increased four-fold and the concern can now handle any kind of work. A specialty of taxicab bodies is made, with features that are claimed to be great improvements over those now in use.

**Timken in Detroit Plant.**—The Timken-Detroit Axle Company expects to occupy its new plant very soon, and within six weeks will have 300 men at work there. The active heads at Detroit will include Messrs. Lewis, Alden and Demory from Canton, and W. H. H. Hutton, who leaves the Chalmers-Detroit company, whom he has been with for the past two years.

**Strang Runs into Fence.**—At Birmingham, Ala., within a hundred feet of where his racing partner, Emil Stricker, was killed last year, Lewis Strang, of New York, narrowly escaped a fatal accident on last Friday. In the fifty-second mile of the 100-mile track race the rim of the right front wheel came off and hurled the machine into the fence. Strang was severely bruised.

**Cole Carriage Company Announces New Model.**—The Cole Carriage Company, of Indianapolis, is arranging to build 500 four-cylinder cars for next season, in addition to the regular line of high-wheeled cars. The motors will develop 30 horsepower and contracts have been placed for them. As a roadster the new model will be sold for \$1,250 and as a touring car for \$1,500.

**Fisk Tires on Pittsburgh Winner.**—The Fisk Rubber Company is calling attention to the fact that the Oldsmobile which won the recent endurance run in and about Pittsburgh was equipped with Fisk tires. Andy Auble, the driver, had no tire trouble, although the roads were some of the worst in the State.

#### IN AND ABOUT THE AGENCIES.

**Permanit, New York.**—The Permanit Company, of New York, has been formed by W. L. Roder, proprietor, and M. J. Stiller, manager, to represent the Adolf Karl Company, of Newark, N. J. Permanit is a preparation to put in tires to make them puncture-proof, and will be sold by the New York agency, in the Thoroughfare building, Broadway and Fifty-seventh street.

**Sultan Company Moves Show Rooms.**—The New York show rooms of the Sultan Motor Company have been moved to 1659 Broadway, where better facilities are offered for exhibiting the runabouts, town cars and taxicabs. The executive and sales department will be located here, but the factory will remain in Springfield, Mass.

**Auto Supply Company, Baltimore, Md.**—A new automobile accessory and supply house has been opened in Baltimore by the Auto Supply Company, at 208 West Saratoga street. Thomas G. Young is president and Edward A. Cassidy, manager.

**Franklin, San Diego, Cal.**—Wilson S. Smith, the agent for the Franklin car, has incorporated a company with a capital stock of \$25,000, and has let a contract for the erection of a garage.



## PERSONAL TRADE MENTION.

**M. Worth Colwell**, who is associated with the Wagner-Field Company, of New York, and is well known as an automobile and fiction writer, has written a one-act comedy which will soon be produced in vaudeville, entitled, "The Child from Pittsburg."

**R. M. Merritt** has resigned from his position as New England manager of the Hoyt Electrical Instrument Works, of Penacook, N. H., to become associated with the Wetmore-Savage Company, of Boston.

**W. M. Sweet** is in charge of the New York office of the Motor and Accessory Manufacturers' Association. Through an error Mr. Sweet's name was given as Street, in a recent number of The Automobile.

**Fred Adams**, who has been connected with the commercial vehicle business in New England for several years, has been appointed manager of the New York branch of the Atlas Motor Car Co.

**George L. Osborn**, who has been until recently connected with the Boston agents for the Stoddard-Dayton, and the Berliet, has joined the forces of the Peerless Company of New England.

**Guy Vaughn**, of the Wyckoff, Church & Partridge force, of New York City, left the city on Tuesday morning with Mrs. Vaughn for a short pleasure trip to Hot Springs, Va.

**E. W. Carter** has been appointed New England manager of the Hoyt Electrical Instrument Works, manufacturers of automobile supplies, Penacook, N. H.

**J. M. Evans**, formerly connected with the E-M-F Company, has taken a new position as advertising manager of the Brush-Detroit Motor Company.

**Charles W. Mears**, advertising manager of the Winton Motor Carriage Company, is making a tour of the Pacific coast.

## NEW FACTORY FOR REMY.

In preparation for an enormous business during the coming season in magnetos, already covered by contracts, the Remy Electric Company, of Anderson, Ind., has contracted for the erection of a number of new buildings, which are to be completed and equipped by August 1. The new factory will be built upon the unit plan, every department being a separate one-story building, which it is claimed gives the greatest efficiency in manufacturing, and reduces the fire risk to a minimum. Some very large orders have been placed for Remy ignition systems, the Overland company signing a contract for 16,000, and another maker taking 30,000. Other lots will be made in sizes varying from 1,000 to 10,000, so that it will be necessary to build 1,000 magnetos a day to meet the demand. With the consummation of such plans for the expansion in manufacture there will be an increase in the line, a specialty being made of smaller, more powerful high-tension, alternating-current magnetos for auto buggies, motor boats, light automobiles and motorcycles. The chief output will continue to be of high-tension systems for automobiles. Departments for making magnetos for stationary engines and for special engines will be installed. The section for manufacturing fittings for attaching Remy magnetos to old models of automobiles will be enlarged, and the administrative offices doubled. A large garage will be erected in which to place cars while they are being fitted. The factory and office forces have been greatly enlarged.

## NEW AGENCIES ESTABLISHED.

**Chalmers-Detroit, Bridgeport, Conn.**—Automobile Repair Company, in addition to the Knox and Stevens-Duryea.

**Selden, Pittsburgh, Pa.**—Duquesne Motor Car Company, Northside.

**Chadwick, Chicago.**—B. C. Hamilton, 1218 Michigan avenue.

## RECENT INCORPORATIONS.

**Grossbrenner Commercial Car Company, Louisville, Ky.**—Capital, \$10,000. To purchase, deal in, and maintain commercial and other vehicles. Incorporators: J. E. Grossbrenner, J. C. Grossbrenner, C. E. Taylor.

**Mutual Garage Company, New York.**—Capital, \$10,000. To manufacture motors, engines, cars, automobiles, etc., and to operate garages. Incorporators: Fred D. Searles, Augustus J. Moran, Winston Holmes.

**Richmond Auto and Supply Company, Staten Island, New York City.**—Capital, \$15,000. To manufacture automobiles and other vehicles. Incorporators: E. J. Forhan, H. M. Browne, J. J. Harper.

**Preston Auto Improvement Company, Boston.**—Capital, \$100,000. General automobile business. President, Robert H. Gowing; treasurer, Frederick G. Preston; clerk, Harold F. Creston.

**Gifford Garage Company, Newark, N. J.**—Capital, \$100,000. To conduct garages. Incorporators: J. W. Gifford, Harry D. Craig, C. S. Craig, Anna S. Gifford, Harry T. Matrice.

**North Jersey Garage, Morristown, N. J.**—Capital, \$25,000. To maintain a garage, and manufacture automobiles. Incorporators: H. H. Nevins, R. S. Foster, H. Archer.

**Chattanooga Taxicab Company, Chattanooga, Tenn.**—Capital, \$10,000. To conduct taxicab service. Incorporators: J. H. Buchholz, S. A. Webb, C. C. Nottingham.

**Taxicab Garage Company, Augusta, Me.**—Capital, \$200,000. To deal in cabs and trucks. President, R. S. Buzzell; treasurer, S. W. Pike; clerk, C. L. Andrews.

**Clark Clayton Auto Company, Spring Lake, N. J.**—Capital, \$20,000. To conduct a garage. Incorporators: Theodore H. Bennett, George M. Height.

**Plainfield Auto Sales Company, Plainfield, N. J.**—Capital, \$25,000. Incorporators: Stephen A. Aldrich, Carleton C. Brown, C. Clarence Rocap.

**Park Motor Car Company, Cleveland, Ohio.**—Capital, \$10,000. Incorporators: G. H. Payne, H. E. Page, P. J. Brown, P. C. Shea, R. A. Causley.

**Spray-Reidsville Motor Company, Spray, N. C.**—Capital, \$25,000. Incorporators: H. L. Hopkins, J. E. Carrington, T. S. Beall.

**Auto Top & Trimming Company, Pontiac, Mich.**—Capital increased from \$20,000 to \$33,000.

**Auto Commercial Company, Detroit.**—Capital increased from \$8,000 to \$12,000.

## SELECTED AUTO PATENTS.

Issue of May 4, 1909.

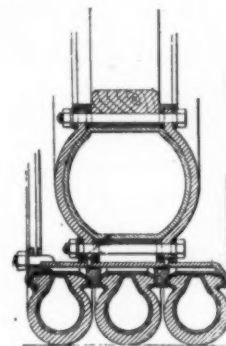
**920,148. Motor Vehicle.**—Russell Huff, Detroit, assignor to Packard Motor Car Company, Detroit. Filed Oct. 12, 1905.

This is the combination of the Packard rear axle, used as a jack shaft, with double chain drive to a lead rear axle as on the trucks now put out by this firm.

**920,417. Explosive Engine.**—Marius Berliet, Lyon, France. Filed July 12, 1906.

This is Berliet's starting device, using compressed air and a sliding camshaft, which brings another and more suitable shaped cam under the push rod.

**920,603. Wheel for Vehicles.**—Edouard E. Michelin, Clermont-Ferrand, France. Filed Jan. 27, 1909.



Michelin's Idea in Triple Tires.

A combination of three or more tires, one large one being used as a sort of resilient felloe, to which is secured two or more ordinary tires for contact with the road surface. In this way a maximum cushioning effect is obtained.

**920,660. Change Speed Gearing.**—Henry Salmond, Glasgow. Filed Sept. 15, 1908.

**920,796. Transmission Gear.**—Daniel G. Welling, Spracuse, N. Y. Filed Oct. 16, 1908.

**920,841. Clutch Mechanism.**—James F. Duryea and William M. Remington, Springfield, Mass., assignors to Stevens-Duryea Company, Chicopee Falls, Mass. Filed July 25, 1908.

This is a slight modification of the well-known Stevens-Duryea plate clutch, in which alternate plates of bronze and steel are used.



Portion of Assembling Room, Showing Where Peerless Chassis Are Put Together.

A scene in the well-known factory of the Peerless Motor Car Company, Cleveland, showing a group of cars in their half-completed state, and at the right a few "sixes" rapidly nearing completion. The space devoted to this purpose allows of the assembling of over thirty cars at once, and additions to the factory now being made will increase this to fifty.

# Information for Auto Users

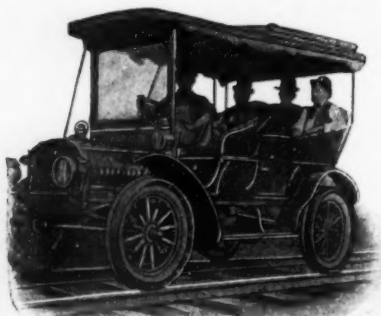
**New Plug Sparks in Oil.**—When spark plugs are improved up to the point that they will continue to give a spark in liquids, particularly in oil, it is apparent that the improvements have about reached the limit of human ingenuity. This is one of the features of the new plug brought out by the Baker Manufacturing Company, of



BAKER SPARK PLUG.

New Haven, Conn., but is by no means the only one worth mentioning. Thus, the multiple sparking point is equally worthy of a good word, for with this it is impossible for the spark to fail to jump. So, too, the enclosed ignition chamber, making for clean points at all times and under all conditions, has made the feature of sparking under water or oil possible, for by making the plug in this way it is self-cleaning. The feature of sparking in oil is the one upon which the makers lay the most stress, for they say that by this means the user is enabled to use more lubricating oil in the cylinders, which makes for longer life of the engine. It also improves the compression, and in this way, the power. So the use of the spark plug which will operate in oil is more than a fad, it is a fine idea and one that in the long run shows a marked economy.

**Tire for Use on Railroad Tracks.**—The automobilist who desires to ride on the railroad tracks can now do so whenever he wishes, for a tire has just been brought out which allows of a rapid change from the one to the other, that is from pneumatics to steel-flanged tires. This is the Goodman automobile railway tire, made by the Good-

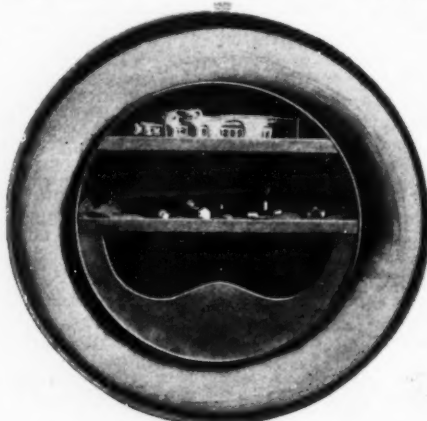


GOODMAN TIRE IN SERVICE.

man Company, of Bucyrus, Ohio, and consists of a steel-flanged tread with fastening means, which allow of its being slipped right on over an ordinary tire. The clips and straps are then used to fasten it central and tight enough to allow of using it safely. In appearance it resembles the better-known

spare wheels, and the method of attaching as well as the time necessary to make the change is about the same. The expression, "You have got to show me; I'm from Missouri," is a familiar one, yet it was in Missouri that the Goodman wheel was first tried out and found to be a success. The first party to stamp them with his approval was an experienced automobilist, but with him in the car at the time were several practical railroad men who pronounced the device a very practical and useful one. Its particular field, aside from the tourist who might want to ride on the rails, is the railway man who possesses an automobile, but desires for business reasons to travel over the railroad right of way.

**An Efficient Space Economizer.**—In line with the modern tendency to reduce the number of parts to a minimum, the newest idea in tire cases is one that is so constructed as to do away with tool boxes. It is primarily a tire case, made of prussia iron and neatly finished up in any desired color. The interior space instead of being wasted, as is usual, is converted into three compartments, each of which has a special



DOW TIRE AND TOOL CASE.

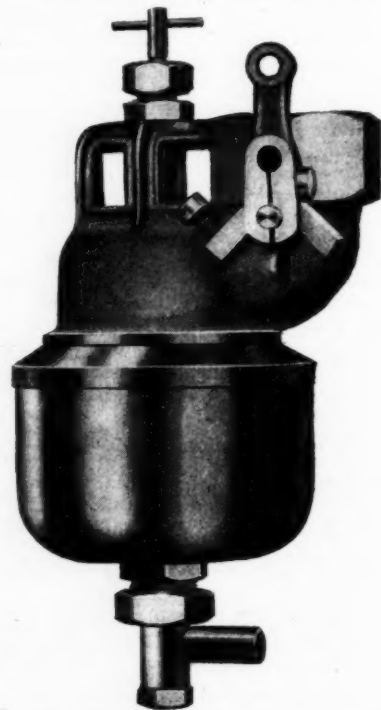
use. Thus, the upper part is intended for jacks and has enough space for two of them, which is as many as any autoist will carry. Below that in the horizontal center of the case is a long, flat compartment for tools. This will hold a full set of tools, while below it at the bottom and occupying most of the interior space, is the compartment set aside for clothing.

This has a capacity of more than will ever be necessary in ordinary touring, for hats, caps, gloves, overcoats, etc. If preferred, this lower part can be so arranged as to be used as an icebox. Moreover, if specified, the whole interior will be made to order as desired.

A suggestion in the way of ornamentation of the exterior of these cases is the monogrammed letter which the company will put on if desired.

The case is made in three sizes: for one, two or three shoes and the interior finish may be had of silk, satin, plush, or in any old style. The maker is the Merrill Manufacturing Company, of Washington street, Boston.

**Waterhouse Carburetor Works on New Principle.**—The recently renewed interest in fuels and the fuel question has stirred up the old discussion relative to carbureters. This has particular reference to the auxiliary air inlet; is it necessary or not? The makers of the Waterhouse carburetor say that it is not, and their vaporizing device does not include one. The operation is based upon a different principle which allows of the elimination of this part and the consequent simplification is held forth as an advantage. The springs, valves and other parts are thus done away with, the number of moving parts reduced to zero, and the number of adjustments to



SPRINGLESS WATERHOUSE CARBURETOR.

one, the needle valve. This one adjustment is very simple, it being only necessary to set the needle when the engine is running; once set, it may be locked permanently by turning down a nut. This nut is so constructed as to lock the needle valve without coming in contact with it, which relieves the troublesome tendency, so often encountered, of dragging the needle valve around with it, and consequently out of adjustment. The carburetor is made and marketed by the Monitor Manufacturing Company, of Boston, who have achieved success with Bemus timers and Monitor distributors.

## NEW TRADE PUBLICATIONS.

**Chas. E. Miller, New York City.**—An annual catalog of automobile parts and sundries of 236 pages and cover has just been issued by Chas. E. Miller, of New York City. This is one of the largest books of its kind ever published, illustrating and listing articles of every assortment, giving the correct descriptive matter, with proper list prices and correct measurements in detail. The publisher calls special attention to the claim that the prices are not inflated, with the proviso that customers may be able to secure a discount. Not only is the new edition handy as a catalog of the Miller products, but as a reference book of automobile, motor boat and motorcycle sundries, both foreign and domestic. Practically every part of an automobile is quoted and illustrated, except the frame and the body, and these can be secured to order; engines, transmissions, steering gears, axles, springs, carburetors, etc., are listed. The general line of accessories, tires, lamps, horns, tops, speedometers, are rated, and dust coats, gloves, goggles, robes, and every imaginable convenience for the autoists themselves.